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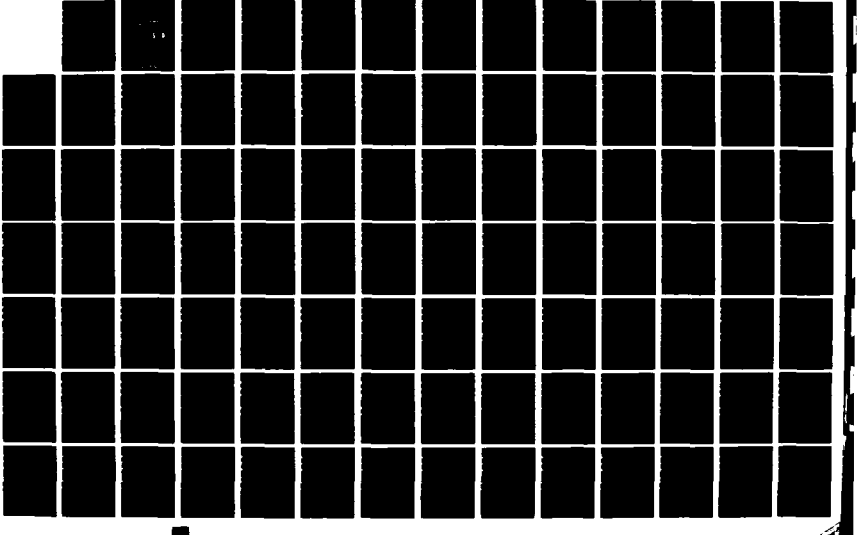

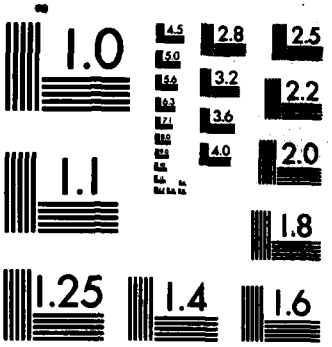

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CRC Report No. 544

1984 CRC OCTANE NUMBER REQUIREMENT SURVEY

December 1985

COORDINATING RESEARCH COUNCIL, INC.
9 PERIMETER CENTER PARKWAY, ATLANTA, GEORGIA 30346

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COORDINATING RESEARCH COUNCIL
INCORPORATED
219 PERIMETER CENTER PARKWAY
ATLANTA, GEORGIA 30346
(404) 396-3400

1984 CRC OCTANE NUMBER REQUIREMENT SURVEY

(CRC PROJECT No. CM-123-84)

Prepared by the

1984 Analysis Panel

of the

CRC Octane Number Requirement Survey Group

December 1985

Light-Duty Vehicle Fuel, Lubricant, and Equipment Research Committee

of the

Coordinating Research Council, Inc.

ABSTRACT

In the thirty-eighth annual statistical survey of current model vehicles conducted by the Coordinating Research Council, Inc., test data were obtained on 407 1984 model vehicles, including 345 US vehicles and 62 imported vehicles. Eighteen laboratories participated in this Survey. Maximum octane number requirements were determined by testing under part-throttle conditions, as well as at maximum-throttle. Requirements are expressed as the Research octane number, Motor octane number, and (R+M)/2 octane number of the reference fuel producing knock which was recurrent and repeatable at the lowest audible level. A new definition of borderline knock was used in this Survey; this change may have affected the 1984 Survey results relative to previous years' Surveys. Estimated octane number requirements for the US vehicles are weighted in proportion to the 1984 vehicle model production figures and, for the imported models, in proportion to import sales volume in the United States.

Keywords: charts; tables (data).

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I. INTRODUCTION

I. INTRODUCTION

In the thirty-eighth annual statistical survey of current model vehicles conducted by the Coordinating Research Council, Inc., test data were obtained on 407 1984 model vehicles, including forty-eight knock sensor-equipped vehicles and eight select models of special interest. A new definition of borderline knock was used in this Survey; at least three pings had to be heard over a minimum range of 50 rpm, and it had to be repeatable. This change may have affected the 1984 Survey results relative to previous years' Surveys. Maximum octane number requirements were determined by testing under part-throttle conditions, as well as at maximum-throttle.* If the maximum requirement was at maximum-throttle, then part-throttle requirements were investigated only with FBRU fuels and only up to four octane numbers lower than the maximum requirement.

Passenger cars and light-duty trucks including non-commercial vans (1/2-3/4 ton without four-wheel drive) were tested to represent the 1984 vehicle population in the United States. This year's Survey includes analyses for the following vehicle categories:

(1) US and Imported Vehicles -- 407 vehicles

(2) US and Imported Cars -- 373 cars

(3) US Vehicles -- 345 vehicles

(4) US Cars -- 316 cars

(5) Imported Vehicles -- 62 vehicles

(6) Knock-Sensor Vehicles -- 48 vehicles

It should be noted that the term "cars" designates passenger cars only, while the term "vehicles" includes passenger cars plus vans and light-duty trucks.

The order of testing reference fuels was the same as the 1983 Survey, which was as follows:

- Tank Fuel.....1st
- High Sensitivity Full-Boiling Range Unleaded (FBRSU) Fuels.....2nd

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* Maximum-throttle is either full-throttle for manual transmissions or widest throttle position that does not cause the transmission to downshift (detent) for automatic transmissions.

- Average Sensitivity Full-Boiling Range Unleaded (FBRU) Fuels.....3rd
- Primary Reference (PR) Fuels.....4th

Eighteen laboratories participated in this Survey; they are listed in Appendix A. Members of the CRC Octane Number Requirement Survey Analysis Panel are identified in Appendix B.

II. SUMMARY

II. SUMMARY

A. Vehicles Tested

Data were collected on 407 1984 vehicles. These vehicles consisted of 345 US vehicles and 62 imported vehicles. There were 316 US and 57 imported passenger cars. The remainder consisted of twenty-nine US and five imported light-duty trucks and vans. The 1984 Survey included sufficient data for eight specific models which were analyzed separately as select models. All select models had automatic transmissions. The average deposit mileage in this Survey was 12,793. The weighted average engine displacement and compression ratio were 3.09 ℓ and 8.69, respectively. Forty-eight vehicles were equipped with knock sensors.

B. Octane Number Requirements

Requirements are expressed as the Research octane number (RON), Motor octane number (MON), and (R+M)/2 octane number of the reference fuel which produced knock that was recurrent and repeatable at the lowest audible level. This definition of borderline knock which was used for the first time in the 1984 Survey may have an influence on the presentation of results as compared with previous Surveys. Estimated octane number requirements for the US cars and light-duty trucks and vans in non-commercial use are weighted in proportion to the 1984 vehicle model production figures and, for the imported models, in proportion to import sales volume in the United States.

Part-throttle requirements were defined when their requirements were higher than the maximum-throttle requirements or, with FBRU fuels only, when they were within four octane numbers of maximum-throttle requirements. The maximum requirements listed for the 1984 Survey were reported by the same method used in prior Surveys (the greater of maximum-throttle or part-throttle). Maximum (high borderline) and minimum (low borderline) octane number requirements were reported for the knock sensor-equipped vehicles when determined.

This is the second Survey in which requirements for knock sensor-equipped vehicles were included in the distribution. The base analysis case for this report uses the maximum (high borderline) octane number requirements of these vehicles. The following table for FBRU fuels presents maximum 1984 octane number requirements and changes from 1983 for the five sample categories, at the 50 percent and 90 percent satisfaction levels.

FBRU OCTANE NUMBER REQUIREMENTS

1984 AND CHANGES FROM 1983

Maximum Octane Number Requirements

Weighted Population	RON 50% Sat.	RON 90% Sat.	MON 50% Sat.	MON 90% Sat.
All US and Imported Vehicles	90.5	95.8	83.0	86.4
from 1983	-0.3	-0.2	-0.3	-0.3
All US and Imported Cars	90.7	95.6	83.1	86.2
from 1983	0.0	-0.7	-0.2	-0.7
All US Vehicles	91.0	95.8	83.3	86.4
from 1983	+0.4	0.0	+0.1	-0.1
All US Cars	91.3	95.6	83.5	86.2
from 1983	+0.7	-0.5	+0.3	-0.6
Imported Vehicles	88.9	95.1	81.9	85.8
from 1983	-2.4	-1.4	-1.8	-1.2

The following table illustrates the impact of knock sensor-equipped vehicles on the six weighted populations for the FBRU fuel series. At the current market penetration levels, inclusion of the knock sensor-equipped vehicles at their minimum (low borderline) requirement reduces the population requirements relative to those calculated at their maximum (high borderline) requirements by about 0.6 RON at low satisfaction levels, and 0.2 to 0.4 RON at high satisfaction levels.

KNOCK-SENSOR IMPACT ON WEIGHTED POPULATION

FBRU RON REQUIREMENTS

Weighted Population		30% Sat.	50% Sat.	70% Sat.	90% Sat.
All US and Imported Vehicles (13.82%)*	KS-H**	88.7	90.5	92.4	95.8
	KS-L	88.2	90.2	92.0	95.6
All US and Imported Cars (11.84%)	KS-H	88.9	90.7	92.6	95.6
	KS-L	88.4	90.5	92.2	95.4
All US Vehicles (17.08%)	KS-H	89.2	91.0	92.8	95.8
	KS-L	88.5	90.6	92.4	95.7
All US Cars (14.63%)	KS-H	89.6	91.3	92.9	95.6
	KS-L	89.0	91.0	92.5	95.4
Imported Vehicles (1.08%)	KS-H	86.5	88.9	90.2	95.1
	KS-L	86.5	88.9	90.2	95.1
All Knock-Sensor Vehicles	KS-H	88.2	90.3	91.9	95.3
	KS-L	83.3	85.1	89.7	92.9

* Knock sensor-equipped vehicles as percent of the associated population.

** KS-H = Population with Knock Sensor-Equipped Vehicles at maximum (high borderline) requirement

KS-L = Population with Knock Sensor-Equipped Vehicles at minimum (low borderline) requirement

Maximum octane requirements for the select models at the 50 percent and 90 percent satisfaction levels for FBRU fuels are summarized as follows.

SELECT MODELS

MAXIMUM FBRU OCTANE NUMBER REQUIREMENTS

Select Model	No. Tested	RON 50% Sat.	RON 90% Sat.	MON 50% Sat.	MON 90% Sat.
KED F22A3/DED F22A3	13	91.5	95.3	83.6	86.0
PKC 222A3/KKC 222A3/ DKC 222A3	14	89.8	94.6	82.4	85.7
OCR 123A3/MCR 123A3	25	90.3	94.8	82.8	85.9
IAE 230A3/LAE 230A3 (High-Borderline)	14	88.0	92.6	81.2	84.4
IAE 230A3/LAE 230A3 (Low-Borderline)	14	85.5	89.7	79.5	82.5
NAR F25A3/HAR F25A3/ IAR F25A3/LAR F25A3	12	92.5	96.1	84.2	86.6
NAX 228A3/HAX 228A3	13	91.7	94.8	83.7	85.7
NBH 450A4/HBH 450A4	12	93.8	96.1	85.0	86.6
NJP F20A3/IJP F20A3/ LJP F20A3	16	92.5	98.5	84.3	88.3

C. Maximum Octane Number Requirements at Part-Throttle

Incidence of part-throttle knock with FBRU greater than maximum-throttle knock was slightly less in 1984 than in 1983. Maximum requirements occurred at part-throttle in 9.3 percent of all 1984 model vehicles with FBRU fuels (38 of 407 vehicles), compared with 16.4 percent in 1983 and 12.0 percent in 1982.

D. Tank Fuel Knock Reported by Trained Raters

In the 1984 Survey, 49.3 percent of the weighted vehicle population knocked on tank fuel, which compares with 44.6 percent in the 1983 Survey and 41.6 percent in the 1982 Survey.

E. Road Octane Number Depreciation

Road octane number depreciation of FBRU fuels in the range 88 to 98 RON varied from 1.3 to 3.1, compared with 1.2 to 2.6 in the 1983 Survey. Depreciation of FBRSU fuels in the range of 88 to 98 RON varied from 2.1 to 4.0, compared with 2.0 to 3.8 in last year's Survey.

F. Speed Range Octane Number Requirements

Octane number requirements across engine speed range were determined on 280 vehicles with primary reference fuels.

G. Gear Position for Maximum Requirements

Of the 407 vehicles tested, 82.8 percent were equipped with automatic transmissions and 17.2 percent were equipped with manual transmissions. Maximum requirements at maximum-throttle occurred in 90.5 percent of automatic transmission vehicles (13.1 percent in fourth gear, 50.6 percent in third gear, and 26.8 percent in second gear). Maximum requirements at maximum-throttle occurred in 91.4 percent of manual transmission vehicles (70.0 percent in fourth gear and 21.4 percent in third gear.

III. TEST VEHICLES

III. TEST VEHICLES

This year's Survey tested a total of 407 1984 model vehicles, compared with 383 vehicles in the 1983 Survey. The analysis of the data included 373 passenger cars (316 US and 57 imports) and 34 non-commercial vans and light-duty trucks (29 US and 5 imports). Also included are 48 knock sensor-equipped vehicles (41 US passenger cars, 6 US trucks, and 1 imported passenger car).

A sufficient amount of data (twelve or more vehicles) was obtained for eight specific engine models which were analyzed as select models. All select models had automatic transmissions, as shown in Table I.

In the 1984 Survey, 83 percent of the transmissions were automatic. Seventy-two percent of the automatics were three-speed, and the rest four-speed. The manual transmissions were divided into one three-speed, twenty-three four-speeds, and forty-six five-speeds. Ninety-one percent of the surveyed vehicles were air-conditioned.

Table II shows the distribution of odometer mileage for both the 1984 and 1983 Surveys. The 1984 distribution is shown as a bar chart in Figure 1. The average odometer mileage was 12,793. The weighted average displacement in 1984 was 3.09 ℓ, compared with 3.10 in 1983. The weighted average compression ratio in 1984 was 8.69, compared with 8.66 in 1983.

The basic timing was adjusted to the manufacturer's recommended setting prior to testing. A total of sixty vehicles were adjusted; thirty-one were more than ±2 degrees off from the manufacturer's setting. The number of vehicles and their deviation in spark setting are shown in Table III.

Participants were requested to rate specific vehicle models in a pattern which would minimize data bias due to differences in testing and vehicle sampling. The United States was divided into four geographical areas with the requested ratings for a given model divided among laboratories within each geographical area.

IV. REFERENCE FUELS

IV. REFERENCE FUELS

Three series of reference fuels were used in the 1984 Survey: primary reference (PR) fuels; average sensitivity full-boiling range unleaded (FBRU) reference fuels with sensitivities similar to those of normal commercial gasoline; and high-sensitivity full-boiling range unleaded (FBRSU) reference fuels with sensitivities about two octane numbers higher than the FBRU fuels.

A. PR Fuels

Isooctane and normal heptane, meeting ASTM specifications, were blended in two octane number increments from 76 to 82 RON, and in one octane number increments from 82 to 100 RON.

B. FBRU Reference Fuels

FBRU fuels were prepared from three base blends (RMFD-350-84, RMFD-351-84, and RMFD-352-84) in two octane number increments from 78 to 84 RON, and in one octane number increments from 84 to 103 RON.

The base blends were prepared from normal refinery components. Inspection data furnished by the supplier are compared with those of the 1983 FBRU fuels in Appendix C, Table C-I. The physical inspections of the 1984 fuels were similar to those of the 1983 fuels; however, the volatility was a little lower in 1984.

The composition and average laboratory octane data for the 1984 FBRU reference fuel series are presented in Appendix C, Table C-II, with the sensitivities compared with the 1983 fuels in Table C-III. The sensitivities of the 1984 fuels were higher than those of the 1983 fuels up to 100 octane.

C. FBRSU Reference Fuels

FBRSU fuels were prepared from three base blends (RMFD-353-84, RMFD-354-84, and RMFD-355-84) in two octane number increments from 78 to 84 RON, and in one octane number increments from 84 to 103 RON.

The base blends were prepared from normal refinery components. Inspection data furnished by the supplier are compared with those of the 1983 base blends in Appendix C, Table C-IV.

The laboratory blending octane data for the 1984 FBRSU reference fuels are presented in Table C-V, with the sensitivities compared with the 1983 fuels in Table C-III. The sensitivities of the 1984 fuels were about the same as those of the 1983 fuels.

V. TEST TECHNIQUE

V. TEST TECHNIQUE

The test technique (CRC Designation E-15-84, Attachment 2 of Appendix D) specified that octane number requirements be determined at level road acceleration conditions. The order of fuel testing was tank fuel, FBRSU fuels, FBRU fuels, and PR fuels. Knocking tendencies were investigated using both maximum-throttle and part-throttle acceleration techniques. Part-throttle was investigated in each vehicle to determine if the part-throttle requirement was higher than the maximum-throttle requirement. In these cases, the part-throttle requirement search was conducted with all three fuels. Part-throttle requirements were also determined with FBRU fuels down to four numbers below the maximum requirement at maximum-throttle.

The octane number requirement of a vehicle is defined as the Research or Motor octane number of the highest octane test fuel producing borderline knock. The maximum octane number requirement of the vehicle is defined as the highest requirement at maximum- or part-throttle. Maximum octane number requirements were obtained over the speed range with PR fuels only. For vehicles equipped with knock sensors, the technique identifies the highest octane fuel that gives borderline knock (maximum or high-borderline requirement) and the lowest octane fuel that gives borderline knock (minimum or low-borderline requirement).

The E-15-84 procedure used in this Survey had been significnatly revised resulting from an octane number requirement rating workshop conducted immediately prior to the 1984 Survey. The major changes to the E-15-84 technique included a modification to the definition of borderline knock; the incorporation of the test technique for knock sensor-equipped vehicles throughout the procedure (instead of being separately appended to the procedure); and the recognition that surface ignition knock is no longer a viable separate category.

The new definition of borderline knock is: spark knock of lowest audible intensity of at least three pings, and over a range of engine speed of at least 50 rpm, all being repeatable during subsequent accelerations. The definition was changed in an effort to eliminate rating a single knock or stray ping that might activate the knock sensor. The new definition now allows knock sensor-equipped vehicles to be rated consistently with conventional vehicles.

VI. DISCUSSION OF RESULTS

VI. DISCUSSION OF RESULTS

A. General

Of the eighteen participating laboratories, four used level roads and fourteen used chassis dynamometers. Seventy-four percent of the cars were tested on chassis dynamometers.

Average test temperature was 70°F, with a barometric pressure average of 29.86 inches Hg and average humidity of 61 grains per pound. Test conditions for individual observations are reported in Appendix E.

As discussed in the Test Technique section, a new definition of borderline knock was used in the 1984 Survey: spark knock of lowest audible intensity of at least three pings, and over a range of engine speed of at least 50 rpm, all being repeatable during subsequent accelerations. Since this was the first time this new definition was used, it may have an influence on the presentation of results as compared with previous Surveys.

B. Distribution of Maximum Octane Number Requirements

The octane number requirement data were used to prepare satisfaction curves and tables for the following samples of 1984 model vehicles: (1) US and Imported Vehicles; (2) US and Imported Cars; (3) US Vehicles; (4) US Cars; (5) Imported Vehicles; and (6) US and Imported Knock-Sensor Vehicles. Research and Motor octane number requirements for the six categories at 50 percent and 90 percent satisfaction are shown in Table IV. In preparing the curves and tables, the octane number requirement data were weighted in accordance with final 1984 model-year production data, and with US sales figures in the case of imports. Each curve and table, therefore, provides an estimate of the distribution of octane number requirements of the appropriate vehicle population on the road. The procedure for assigning weighting factors and for calculating the octane number requirement distributions is described in Appendix F.

Vehicles equipped with knock sensors were included in the 1984 models tested. The vehicles with knock sensors were tested for maximum (high-borderline) octane number requirements and minimum (low-borderline) octane number requirements. Octane number requirement distributions were calculated for each group of vehicles using the requirements from those vehicles with knock sensors rated at maximum (high-borderline) requirement and with their ratings at minimum (low-borderline) requirement. The results are tabulated in Tables XXIX through XLIII. Maximum octane number requirements for the 1984 model vehicles were considered to be the requirements which included the knock sensor-equipped vehicles at the maximum (high-borderline) requirement.

1. US and Imported Vehicles

In the 1984 Survey, maximum octane number requirements were determined on 402 vehicles with PR fuels, on 407 vehicles with FBRU fuels, and on 403 vehicles with FBRSU fuels. Forty-eight of the vehicles were equipped with knock sensors.

Maximum Research octane number requirements for all three reference fuels are shown in Figures 2a, 3a, 4a (rectangular coordinates) and 2b, 3b, 4b (probability plots). Each plot compares the requirements with knock-sensor ratings at the maximum (high-borderline) level and the minimum (low-borderline) level. The maximum Research octane number requirements for all three reference fuels are plotted in Figures 5a (rectangular coordinates) and 5b (probability plot). The octane number requirement distributions for each case are very nearly the same. Maximum Research, Motor, and (R+M)/2 octane number requirements are listed in Table V. The 50 percent and 90 percent satisfaction level requirements are as follows:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	89.0	89.0	89.0	93.0	93.0	93.0
FBRU	90.5	83.0	86.7	95.8	86.4	91.1
FBRSU	91.5	81.7	86.6	96.8	85.1	91.0

Comparisons of 1984 and 1983 Survey maximum Research, Motor, and (R+M)/2 octane number requirements are shown in Tables VI, VII, and VIII, respectively, for all three fuel series. Distributions of maximum RON requirements are shown in Figure 6 for PR fuels, Figure 7 for FBRU fuels, and Figure 8 for FBRSU fuels. The differences at the 50 percent and 90 percent satisfaction levels are summarized in the following table:

DIFFERENCES BETWEEN 1984 AND 1983 MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	-0.4	-0.4	-0.4	-0.6	-0.6	-0.6
FBRU	-0.3	-0.3	-0.4	-0.2	-0.3	-0.3
FBRSU	0.0	+0.1	+0.1	-0.6	-0.4	-0.4

Confidence limits for maximum octane number requirement distributions are given in Appendix G, Table G-I. The 95 percent confidence limits for Research octane number requirements varied from ±0.30 to ±0.40 at the 50 percent satisfaction level, and from ±0.41 to ±0.54 at the 90 percent satisfaction level.

2. US and Imported Cars

Maximum octane number requirements were determined on 368 US and imported cars with PR fuels, on 373 cars with FBRU fuels, and on 369 cars in the case of FBRSU fuels.

Maximum Research, Motor, and (R+M)/2 octane number requirements on all three fuel series are given in Table IX. The maximum Research octane number requirement distributions for all three reference fuels are plotted in Figures 9a (rectangular coordinates) and 9b (probability plot). Maximum octane number requirements at the 50 percent and 90 percent satisfaction levels are summarized in the following table:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Cars)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	89.0	89.0	89.0	92.8	92.8	92.8
FBRU	90.7	83.1	86.9	95.6	86.2	90.9
FBRSU	91.9	81.9	86.9	96.8	85.1	91.0

The maximum Research octane number requirements for 1984 US and imported cars are compared with 1983 model-year data in Table X for PR, FBRU, and FBRSU fuels. Corresponding comparisons of Motor and (R+M)/2 octane number requirements are given in Tables XI and XII, respectively. Differences between 1984 and 1983 data at the 50 percent and 90 percent satisfaction levels are as follows:

DIFFERENCES BETWEEN 1984 AND 1983 MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Cars)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	-0.3	-0.3	-0.3	-1.0	-1.0	-1.0
FBRU	0.0	-0.2	-0.1	-0.7	-0.7	-0.7
FBRSU	+0.5	+0.3	+0.4	-0.9	-0.6	-0.7

Confidence limits for maximum octane number requirement distributions of 1984 US and imported cars are given in Appendix G, Table G-I. The 95 percent confidence limits for Research octane number requirements varied from ±0.31 to ±0.39 at the 50 percent satisfaction level, and from ±0.42 to ±0.53 at the 90 percent satisfaction level.

3. US Vehicles

Maximum octane number requirements were determined on 340 US vehicles with PR fuels, on 345 vehicles with FBRU fuels, and 341 vehicles with FBRSU fuels.

Distributions of maximum Research octane number requirements are plotted in Figures 10a and 10b for the three fuel series. Research, Motor, and (R+M)/2 octane number requirements for the US vehicles are given in Table XIII. Octane number requirements at the 50 percent and 90 percent satisfaction levels are listed below:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(US Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	89.3	89.3	89.3	93.0	93.0	93.0
FBRU	91.0	83.3	87.2	95.8	86.4	91.1
FBRSU	92.0	82.0	87.0	97.0	85.2	91.1

Comparisons of maximum octane number requirements of 1984 and 1983 US vehicles for the three fuel series are given in Tables XIV, XV, and XVI in terms of RON, MON, and (R+M)/2, respectively. Distributions of maximum Research octane number requirements are shown in Figure 11 for PR fuels, in Figure 12 for FBRU fuels, and in Figure 13 for FBRSU fuels. Differences between octane number requirements of 1984 and 1983 US vehicles at the 50 percent and 90 percent satisfaction levels are given in the following table:

DIFFERENCES BETWEEN 1984 AND 1983 MAXIMUM OCTANE NUMBER REQUIREMENTS

(US Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	+0.3	+0.3	+0.3	+0.3	+0.3	+0.3
FBRU	+0.4	+0.1	+0.3	0.0	-0.1	0.0
FBRSU	+0.7	+0.5	+0.6	-0.7	-0.5	-0.6

Confidence limits for maximum octane number requirement distributions of 1984 US vehicles are tabulated in Appendix G, Table G-I. The 95 percent confidence limits for Research octane number requirements were from ±0.31 to ±0.41 at the 50 percent satisfaction level, and from ±0.42 to ±0.56 at the 90 percent satisfaction level.

4. US Cars

Maximum octane number requirements were determined on 311 US cars with PR fuels, on 316 cars with FBRU fuels, and on 312 cars with FBRSU fuels.

Distributions of maximum Research octane number requirements are plotted in Figures 14a (rectangular coordinates) and 14b (probability plot) for the three fuel series. Maximum Research, Motor, and (R+M)/2 octane number requirements for all three fuel series are given in Table XVII, and summarized below for the 50 percent and 90 percent satisfaction levels:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(US Cars)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	89.3	89.3	89.3	92.8	92.8	92.8
FBRU	91.3	83.5	87.4	95.6	86.2	91.0
FBRSU	92.4	82.2	87.3	97.0	85.2	91.1

The maximum Research, Motor, and (R+M)/2 octane number requirements of US cars tested in the 1984 and 1983 Surveys are compared in Tables XVIII, XIX and XX, respectively, for all three fuel series. The differences at the 50 percent and 90 percent satisfaction levels are as follows:

DIFFERENCES BETWEEN 1984 AND 1983 MAXIMUM OCTANE NUMBER REQUIREMENTS

(US Cars)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	+0.4	+0.4	+0.4	+0.1	+0.1	+0.1
FBRU	+0.7	+0.3	+0.5	-0.5	-0.6	-0.5
FBRSU	+1.2	+0.8	+1.0	-1.1	-0.8	-0.9

Confidence limits for maximum octane number requirement distributions of 1984 US cars are given in Appendix G, Table G-I. The 95 percent confidence limits for Research octane number requirements varied between ±0.31 and ±0.39 at the 50 percent satisfaction level, and between ±0.41 and ±0.53 at the 90 percent satisfaction level.

5. Imported Vehicles

Maximum octane number requirements were determined on sixty-two imported vehicles with PR, FBRU, and FBRSU fuels. Maximum Research octane number requirements for all three reference fuel series are plotted in Figures 15a and 15b. Maximum octane number requirements in terms of RON, MON, and (R+M)/2 are given in Table XXI. The 50 percent and 90 percent satisfaction level maximum octane number requirements are listed in the following table:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(Imported Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	88.2	88.2	88.2	93.1	93.1	93.1
FBRU	88.9	81.9	85.4	95.1	85.8	90.5
FBRSU	89.6	80.4	85.0	95.8	84.4	90.1

The maximum Research, Motor, and (R+M)/2 octane number requirements of imported vehicles in the 1984 and 1983 Surveys are compared in Tables XXII, XXIII, and XXIV, respectively, for all three fuel series. The differences at the 50 percent and 90 percent satisfaction levels are as follows:

DIFFERENCES BETWEEN 1984 AND 1983 MAXIMUM OCTANE NUMBER REQUIREMENTS

(Imported Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	-2.2	-2.2	-2.2	-3.2	-3.2	-3.2
FBRU	-2.4	-1.8	-2.1	-1.4	-1.2	-1.2
FBRSU	-2.5	-1.6	-2.1	-1.0	-0.6	-0.8

Confidence limits for maximum octane number requirement distributions of 1984 imported vehicles are tabulated in Appendix G, Table G-I. The 95 percent confidence limits for Research octane number requirements were from ±0.84 to ±1.33 at the 50 percent satisfaction level, and from ±1.13 to ±1.81 at the 90 percent satisfaction level.

6. US and Imported Knock-Sensor Vehicles Only

Maximum octane number requirements were determined on forty-eight US and imported vehicles containing knock sensors on PR, FBRU, and FBRSU fuels.

Distributions of maximum Research octane number requirements for the three fuel series are plotted in Figures 16 and 17. The distributions of maximum Research octane number requirements at the maximum (high-borderline) and the minimum (low-borderline) levels are shown in Figure 18 for FBRU fuels. Maximum Research, Motor, and (R+M)/2 octane number requirements for all three fuel series are given in Table XXV, and summarized below for the 50 percent and 90 percent satisfaction levels:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(1984 US and Imported Knock Sensor Vehicles Only)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	89.0	89.0	89.0	92.4	92.4	92.4
FBRU	90.3	82.8	86.5	95.3	86.0	90.7
FBRSU	91.0	81.3	86.2	96.9	85.1	91.0

Research octane requirements at the maximum (high-borderline) and minimum (low-borderline) levels are given in Tables XXVI, XXVII, and XXVIII, respectively, for all three fuel series.

7. Maximum Requirements at Part-Throttle

The throttle positions for maximum octane number requirements of tested vehicles were reported as maximum-throttle or part-throttle. Maximum part-throttle requirements were defined when their requirements were higher than the maximum maximum-throttle requirements. The number and percentage of vehicles having FBRU part-throttle octane number requirements greater than maximum-throttle requirements are shown below, along with a comparison with the 1983 Survey. The percentages of all vehicles having maximum requirements at part-throttle were 9.3 percent in 1984, compared with 16.4 percent in 1983 and 12.0 percent in 1982.

VEHICLES HAVING FBRU PART-THROTTLE REQUIREMENTS
> MAXIMUM-THROTTLE REQUIREMENTS

(1984 and 1983 US and Imported Vehicles)

	No. Vehicles Tested	No. of Vehicles	% of Vehicles
1984 US and Imported Vehicles	407	38	9.3
1983 US and Imported Vehicles	383	63	16.4

C. Part-Throttle Requirements

Of the 407 vehicles tested, 348 were tested for part-throttle requirements down to four octane numbers below maximum-throttle requirements with FBRU fuels. One of the part-throttle tested vehicles had a requirement below 78 RON, the lowest octane fuel available. Of the remaining, 86 vehicles (25 percent) had part-throttle requirements more than four octane numbers below the maximum-throttle requirements.

D. Select Models

Eight select models, representing eight engine-chassis combinations, were tested. The select models tested in this year's Survey included one knock sensor-equipped model. The identification and specifications of the engine-chassis combinations of the select models are given in Table I.

Maximum Research, Motor, and (R+M)/2 octane number requirements are shown for 50 percent and 90 percent satisfaction levels on PR, FBRU, and FBRSU fuels in Table XLIV. Maximum octane number requirements for each select model at various satisfaction levels are listed in Appendix H, Tables H-I through H-VIII. The maximum (high-borderline) and minimum (low-borderline) octane number requirements for the knock sensor-equipped models are given in Tables H-IVA and H-IVB, respectively.

Maximum Research octane number satisfaction curves for the eight select models are shown in Figures 19 through 26 for all three fuel series. The maximum (high-borderline) and minimum (low-borderline) octane number requirements for the knock-sensor models are given in Figures 22A and 22B, respectively. Each curve was constructed by use of a standard method which assumes normal distribution, discussed in Appendix F. The 95 percent confidence limits for maximum requirements are shown in Appendix G, Table G-II.

E. Tank Fuel

As required by the program, tank fuel was tested for incidence of knock whenever an owners' questionnaire was obtained, although owners' questionnaires were required to be obtained only when the vehicle tested had a regular driver and the ignition timing did not have to be reset more than two degrees. To gain additional information, however, tank fuel ratings were made by many participants on many other vehicles which did not meet the restrictions listed.

1. Owner/Rater Comparison of Tank Fuel Knock

Although owners' questionnaires were obtained on a total of 175 vehicles, only 149 of these vehicles had both owner/rater tank fuel data with no change in spark timing. Of the 149 1984 vehicles, 51.7 percent were reported by trained raters to be knocking on tank fuel, whereas the owners reported 26.2 percent. This results in an owner/rater knock ratio of 0.51. The 51.7 percent of vehicles found to be knocking by trained raters in 1984 is lower than in the 1983 Survey. The owner/rater comparison of tank fuel knock data for 1984, along with previous Survey data back to 1977, is presented in Table XLV.

2. Objectionable Versus Unobjectionable Knock

Of the owners reporting knock with vehicles which had no change in spark timing, 28.2 percent found knock to be objectionable. This percentage of objectionable knock is lower than the 42.1 percent found in 1983, as shown in Table XLV.

3. Tank Fuel Knock Reported by Trained Raters

Tank fuel knock observations were reported by trained raters on 358 of the 407 test vehicles. The percentages of all 1984 vehicles and the select models knocking on tank fuel are shown in Table XLVI. On a weighted basis, 49.3 percent of the 1984 vehicles tested knocked on tank fuel, compared with 44.6 percent in the 1983 Survey and 41.6 percent of the vehicles in the 1982 Survey. As shown in the table, three of the eight select models tested had high knocking percentages of 72.7, 73.3, and 80.0.

4. Tank Fuel Octane Measurement Comparisons

Tank fuel octane measurements were obtained on 133 vehicles with both owner/rater data and no change in spark timing. These vehicles consisted of 110 vehicles that had tank fuel octane measurements less than 90 (R+M)/2 and 23 vehicles that had tank fuel octane measurements greater than or equal to 90 (R+M)/2. Of

the 110 vehicles with tank fuel octane numbers less han 90 (R+M)/2, trained raters reported knock on 59.1 percent and owners reported knock on 29.1 percent of the vehicles. Owners objected to knock on 7.3 percent of these vehicles. Of the twenty-three vehicles with tank fuel octane numbers greater than or equal to 90 (R+M)/2, both trained raters and owners reported knock on 17.4 percent of the vehicles. Owners objected to knock on only 4.3 percent of these vehicles.

F. Engine Speed for Maximum Octane Number Requirements

Engine speeds at which maximum octane number requirements occurred for each select model are shown in Table XLVII for PR, FBRU, and FBRSU fuels. Weighted data for all 1984 vehicles are shown in Table XLVIII and Figure 27.

G. Road Octane Number Depreciation of FBRU and FBRSU Fuels

Road octane number ratings and road octane number depreciation for FBRU and FBRSU fuels were determined from the octane number requirement data for all vehicles. The results are shown in Table XLIX.

In this report, the road octane number rating of FBRU and FBRSU fuels is defined as the primary reference fuel octane level which satisfied the same percentage of vehicles. Depreciation values were established by subtracting the road octane number rating of the fuel from its Research octane number. Depreciation values of FBRU fuels in the range 88 to 98 RON varied from 1.3 to 3.1, compared with 1.2 to 2.6 in the 1983 Survey. Depreciation of FBRSU fuels in the range of 88 to 98 RON varied from 2.1 to 4.0, compared with 2.0 to 3.8 in last year's Survey.

H. Speed Range Octane Number Requirement

Primary reference fuel (PRF) octane number requirements were determined over a range of engine speeds from 1000 to 3750 rpm on 280 vehicles. Individual vehicle data are in Appendix I, Table I-I. For the eight select models, speed range data were analyzed on 86 cars. The mean PRF octane number requirement, standard deviation, and number of observations within each speed range are in Table I-II. Mean PRF requirements for the eight select models are plotted in Figures I-1 through I-8.

I. Gear Position for Maximum Requirements

The throttle/gear position for maximum octane number requirements on FBRU fuels is shown in Appendix J. Of the 407 vehicles tested, 337 (82.8 percent) were equipped with automatic transmissions and 70 (17.2 percent) were equipped with manual transmissions.

Maximum requirements at maximum-throttle occurred in 90.5 percent of the automatic transmission vehicles (13.1 percent in fourth gear, 50.6 percent in third gear, and 26.8 percent in second gear). Maximum requirements at part-throttle occurred in 9.5 percent of the automatic transmission vehicles.

For manual transmission vehicles, 91.4 percent had maximum requirements at maximum-throttle (70.0 percent in fourth gear and 21.4 percent in third gear. Maximum requirements at part-throttle occurred in 8.6 percent of manual transmission vehicles. Fifth gear for five-speed manual transmissions was not examined per program instructions.

TABLES

AND

FIGURES

TABLE I

1984 SELECT MODEL SPECIFICATIONS

Model	Disp. Liters	Engine Type	Brake HP	Carb. Bbl.	Comp. Ratio	Trans-mission
Chrysler Corporation:						
600/E Class	2.2	L-4	99	F.I.	9.0	Automatic
Reliant/Aries/LeBaron	2.2	L-4	96	2-Bbl	9.0	Automatic
Ford Motor Company:						
Tempo/Topaz	2.3	L-4	84	1-Bbl	9.0	Automatic
General Motors Corporation:						
Ciera/Century (knock-sensor)	3.0	V-6	110	2-Bbl	8.4	Automatic
Celebrity/6000/Ciera/Century	2.5	L-4	92	F.I.	9.0	Automatic
Celebrity/6000	2.8	V-6	112	2-Bbl	8.5	Automatic
Caprice/Parisienne	5.0	V-8	150	4-Bbl	8.6	Automatic*
Cavalier/Firenza/Skyhawk	2.0	L-4	88	F.I.	9.3	Automatic

* Four-speed transmission, all others are three-speed transmission.

TABLE II

DISTRIBUTION OF ODOMETER MILEAGE FOR TESTED VEHICLES

Mileage	No. of Vehicles Within Mileage Increments 1983 Vehicles	1984 Vehicles
0 - 1,999	0	0
2,000 - 3,999	0	0
4,000 - 5,999	28	0
6,000 - 7,999	88	95
8,000 - 9,999	69	65
10,000 - 11,999	63	58
12,000 - 13,999	44	41
14,000 - 15,999	26	48
16,000 - 17,999	25	32
18,000 - 19,999	12	27
20,000 - 24,999	22	27
25,000 - 29,999	3	10
30,000 +	3	4
No. of Vehicles	383	407
Average Mileage	11,374	12,793

TABLE III

1984 BASIC TIMING ADJUSTMENTS

Degrees From Manufacturer's Setting	No. of Vehicles	
	+	-
1	5	1
2	17	6
3	8	2
4	6	5
5	2	1
6	1	1
7	0	0
8	0	0
9	0	0
10	1	2
11+	0	2
	40	20
TOTAL	60	

TABLE IV

OCTANE NUMBER REQUIREMENTS WITH 95% CONFIDENCE LIMITS

Weighted Population	Fuel	No. Vehicles	Research Octane No. 50% Sat.	Research Octane No. 90% Sat.	Motor Octane No. 50% Sat.	Motor Octane No. 90% Sat.
Maximum Octane Number Requirements						
• US and Imported Vehicles	PR	402	89.0 ± 0.30	93.0 ± 0.41	89.0 ± 0.30	93.0 ± 0.41
	FBRU	407	90.5 ± 0.39	95.8 ± 0.53	83.0 ± 0.25	86.4 ± 0.33
	FBRSU	403	91.5 ± 0.40	96.8 ± 0.54	81.7 ± 0.26	85.1 ± 0.36
• US and Imported Cars	PR	368	89.0 ± 0.31	92.8 ± 0.42	89.0 ± 0.31	92.8 ± 0.42
	FBRU	373	90.7 ± 0.38	95.6 ± 0.51	83.1 ± 0.23	86.2 ± 0.32
	FBRSU	369	91.9 ± 0.39	96.8 ± 0.53	81.9 ± 0.25	85.1 ± 0.34
• US Vehicles	PR	340	89.3 ± 0.31	93.0 ± 0.42	89.3 ± 0.31	93.0 ± 0.42
	FBRU	345	91.0 ± 0.40	95.8 ± 0.54	83.3 ± 0.25	86.4 ± 0.34
	FBRSU	341	92.0 ± 0.41	97.0 ± 0.56	82.0 ± 0.27	85.2 ± 0.36
• US Cars	PR	311	89.3 ± 0.31	92.8 ± 0.41	89.3 ± 0.31	92.8 ± 0.41
	FBRU	316	91.3 ± 0.38	95.6 ± 0.51	83.5 ± 0.23	86.2 ± 0.32
	FBRSU	312	92.4 ± 0.39	97.0 ± 0.53	82.2 ± 0.26	85.2 ± 0.35
• Imported Vehicles	PR	62	88.2 ± 0.84	93.1 ± 1.13	88.2 ± 0.84	93.1 ± 1.13
	FBRU	62	88.9 ± 1.02	95.1 ± 1.39	81.9 ± 0.67	85.8 ± 0.90
	FBRSU	62	89.6 ± 1.33	95.8 ± 1.81	80.4 ± 0.87	84.4 ± 1.18
• US and Imported Knock-Sensor Vehicles	PR	48	89.0 ± 0.79	92.4 ± 1.07	89.0 ± 0.79	92.4 ± 1.07
	FBRU	48	90.3 ± 1.04	95.3 ± 1.41	82.8 ± 0.64	86.0 ± 0.87
	FBRSU	48	91.0 ± 1.35	96.9 ± 1.83	81.3 ± 0.89	85.1 ± 1.20

TABLE V

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 US and Imported Vehicles

Percent Satisfied	PR Fuels	FBRU Fuels			FBRSU Fuels		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	84.1	85.8	79.6	82.7	86.8	78.5	82.7
20	86.2	87.6	81.0	84.3	88.3	79.6	84.0
30	87.4	88.7	81.8	85.3	89.6	80.3	85.0
40	88.2	89.7	82.4	86.0	90.6	81.0	85.8
50	89.0	90.5	83.0	86.7	91.5	81.7	86.6
60	89.7	91.4	83.5	87.4	92.6	82.3	87.4
70	90.5	92.4	84.2	88.3	93.7	83.0	88.4
80	91.6	93.7	85.0	89.4	95.1	84.0	89.5
90	93.0	95.8	86.4	91.1	96.8	85.1	91.0
95	94.3	97.2	87.2	92.2	98.4	86.2	92.4
98	97.3	99.7	89.3	94.5	100.6	87.9	94.3
99	H	100.7	90.2	95.5	101.7	88.9	95.3

TABLE VI

COMPARISON OF MAXIMUM RESEARCH OCTANE NUMBER REQUIREMENTS

1984 and 1983 US and Imported Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.1	85.0	-0.9	85.8	86.5	-0.7	86.8	87.0	-0.2
20	86.2	86.7	-0.5	87.6	87.9	-0.3	88.3	88.7	-0.4
30	87.4	87.7	-0.3	88.7	89.1	-0.4	89.6	89.7	-0.1
40	88.2	88.5	-0.3	89.7	90.1	-0.4	90.6	90.7	-0.1
50	89.0	89.4	-0.4	90.5	90.8	-0.3	91.5	91.5	0.0
60	89.7	90.2	-0.5	91.4	91.5	-0.1	92.6	92.3	0.3
70	90.5	91.1	-0.6	92.4	92.4	0.0	93.7	93.3	0.4
80	91.6	92.0	-0.4	93.7	93.9	-0.2	95.1	95.0	0.1
90	93.0	93.6	-0.6	95.8	96.0	-0.2	96.8	97.4	-0.6
95	94.3	95.5	-1.2	97.2	97.8	-0.6	98.4	99.5	-1.1
98	97.3	96.8	0.5	99.7	H	-	100.6	H	-
99	H	97.8	-	100.7	H	-	101.7	H	-

TABLE VII

COMPARISON OF MAXIMUM MOTOR OCTANE NUMBER REQUIREMENTS

1984 and 1983 US and Imported Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.1	85.0	-0.9	79.6	80.6	-1.0	78.5	78.5	0.0
20	86.2	86.7	-0.5	81.0	81.6	-0.6	79.6	79.8	-0.2
30	87.4	87.7	-0.3	81.8	82.3	-0.5	80.3	80.5	-0.2
40	88.2	88.5	-0.3	82.4	82.8	-0.4	81.0	81.1	-0.1
50	89.0	89.4	-0.4	83.0	83.3	-0.3	81.7	81.6	0.1
60	89.7	90.2	-0.5	83.5	83.8	-0.3	82.3	82.1	0.2
70	90.5	91.1	-0.6	84.2	84.4	-0.2	83.0	82.7	0.3
80	91.6	92.0	-0.4	85.0	85.3	-0.3	84.0	83.8	0.2
90	93.0	93.6	-0.6	86.4	86.7	-0.3	85.1	85.5	-0.4
95	94.3	95.5	-1.2	87.2	87.9	-0.7	86.2	86.9	-0.7
98	97.3	96.8	0.5	89.3	H	-	87.9	H	-
99	H	97.8	-	90.2	H	-	88.9	H	-

TABLE VIII

COMPARISON OF MAXIMUM (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 and 1983 US and Imported Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.1	85.0	-0.9	82.7	83.5	-0.8	82.7	82.8	-0.1
20	86.2	86.7	-0.5	84.3	84.8	-0.5	84.0	84.2	-0.2
30	87.4	87.7	-0.3	85.3	85.7	-0.4	85.0	85.1	-0.1
40	88.2	88.5	-0.3	86.0	86.4	-0.4	85.8	85.9	-0.1
50	89.0	89.4	-0.4	86.7	87.1	-0.4	86.6	86.5	0.1
60	89.7	90.2	-0.5	87.4	87.7	-0.3	87.4	87.2	0.2
70	90.5	91.1	-0.6	88.3	88.4	-0.1	88.4	88.0	0.4
80	91.6	92.0	-0.4	89.4	89.6	-0.2	89.5	89.4	0.1
90	93.0	93.6	-0.6	91.1	91.4	-0.3	91.0	91.4	-0.4
95	94.3	95.5	-1.2	92.2	92.8	-0.6	92.4	93.2	-0.8
98	97.3	96.8	0.5	94.5	H	-	94.3	H	-
99	H	97.8	-	95.5	H	-	95.3	H	-

TABLE IX

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 US and Imported Cars

Percent Satisfied	PR Fuels	FBRU Fuels			FBRSU Fuels		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	84.2	85.9	79.6	82.8	86.9	78.6	82.7
20	86.2	87.7	81.1	84.4	88.5	79.7	84.1
30	87.4	88.9	81.9	85.4	89.9	80.6	85.2
40	88.2	89.9	82.5	86.2	90.9	81.2	86.0
50	89.0	90.7	83.1	86.9	91.9	81.9	86.9
60	89.7	91.6	83.7	87.6	92.9	82.5	87.7
70	90.5	92.6	84.3	88.4	94.0	83.2	88.6
80	91.6	93.8	85.0	89.4	95.2	84.0	89.6
90	92.8	95.6	86.2	90.9	96.8	85.1	91.0
95	93.8	96.9	87.1	92.0	98.2	86.0	92.1
98	95.2	98.7	88.4	93.6	99.7	87.1	93.4
99	97.0	100.2	89.7	95.0	101.0	88.2	94.7

TABLE X

COMPARISON OF MAXIMUM RESEARCH OCTANE NUMBER REQUIREMENTS

1984 and 1983 US and Imported Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.2	84.7	-0.5	85.9	86.3	-0.4	86.9	86.8	0.1
20	86.2	86.5	-0.3	87.7	87.9	-0.2	88.5	88.7	-0.2
30	87.4	87.5	-0.1	88.9	89.1	-0.2	89.9	89.7	0.2
40	88.2	88.4	-0.2	89.9	90.1	-0.2	90.9	90.6	0.3
50	89.0	89.3	-0.3	90.7	90.7	0.0	91.9	91.4	0.5
60	89.7	90.0	-0.3	91.6	91.5	0.1	92.9	92.3	0.6
70	90.5	91.0	-0.5	92.6	92.5	0.1	94.0	93.4	0.6
80	91.6	92.0	-0.4	93.8	94.0	-0.2	95.2	95.4	-0.2
90	92.8	93.8	-1.0	95.6	96.3	-0.7	96.8	97.7	-0.9
95	93.8	95.7	-1.9	96.9	98.2	-1.3	98.2	100.1	-1.9
98	95.2	97.0	-1.8	98.7	H	-	99.7	H	-
99	97.0	98.0	-1.0	100.2	H	-	101.0	H	-

TABLE XI

COMPARISON OF MAXIMUM MOTOR OCTANE NUMBER REQUIREMENTS

1984 and 1983 US and Imported Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.2	84.7	-0.5	79.6	80.5	-0.9	78.6	78.3	0.3
20	86.2	86.5	-0.3	81.1	81.5	-0.4	79.7	79.8	-0.1
30	87.4	87.5	-0.1	81.9	82.3	-0.4	80.6	80.5	0.1
40	88.2	88.4	-0.2	82.5	82.8	-0.3	81.2	81.1	0.1
50	89.0	89.3	-0.3	83.1	83.3	-0.2	81.9	81.6	0.3
60	89.7	90.0	-0.3	83.7	83.8	-0.1	82.5	82.1	0.4
70	90.5	91.0	-0.5	84.3	84.4	-0.1	83.2	82.8	0.4
80	91.6	92.0	-0.4	85.0	85.4	-0.4	84.0	84.1	-0.1
90	92.8	93.8	-1.0	86.2	86.9	-0.7	85.1	85.7	-0.6
95	93.8	95.7	-1.9	87.1	88.1	-1.0	86.0	87.4	-1.4
98	95.2	97.0	-1.8	88.4	H	-	87.1	H	-
99	97.0	98.0	-1.0	89.7	H	-	88.2	H	-

TABLE XII

COMPARISON OF MAXIMUM (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 and 1983 US and Imported Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.2	84.7	-0.5	82.8	83.4	-0.6	82.7	82.5	0.2
20	86.2	86.5	-0.3	84.4	84.7	-0.3	84.1	84.2	-0.1
30	87.4	87.5	-0.1	85.4	85.7	-0.3	85.2	85.1	0.1
40	88.2	88.4	-0.2	86.2	86.4	-0.2	86.0	85.9	0.1
50	89.0	89.3	-0.3	86.9	87.0	-0.1	86.9	86.5	0.4
60	89.7	90.0	-0.3	87.6	87.7	-0.1	87.7	87.2	0.5
70	90.5	91.0	-0.5	88.4	88.5	-0.1	88.6	88.1	0.5
80	91.6	92.0	-0.4	89.4	89.7	-0.3	89.6	89.8	-0.2
90	92.8	93.8	-1.0	90.9	91.6	-0.7	91.0	91.7	-0.7
95	93.8	95.7	-1.9	92.0	93.2	-1.2	92.1	93.7	-1.6
98	95.2	97.0	-1.8	93.6	H	-	93.4	H	-
99	97.0	98.0	-1.0	95.0	H	-	94.7	H	-

TABLE XIII

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 US Vehicles

Percent Satisfied	PR Fuels	FBRU Fuels			FBRSU Fuels		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	84.5	86.8	80.4	83.6	87.6	79.1	83.3
20	86.6	88.2	81.4	84.8	89.0	80.0	84.5
30	87.6	89.2	82.1	85.7	90.1	80.6	85.4
40	88.5	90.2	82.7	86.5	91.0	81.3	86.1
50	89.3	91.0	83.3	87.2	92.0	82.0	87.0
60	89.9	91.8	83.8	87.8	93.0	82.6	87.8
70	90.7	92.8	84.4	88.6	94.0	83.2	88.6
80	91.7	94.0	85.1	89.6	95.3	84.1	89.7
90	93.0	95.8	86.4	91.1	97.0	85.2	91.1
95	94.4	97.0	87.1	92.0	98.6	86.4	92.5
98	98.1	100.1	89.6	94.8	100.9	88.2	94.5
99	H	H	H	H	101.8	89.0	95.4

TABLE XIV

COMPARISON OF MAXIMUM RESEARCH OCTANE NUMBER REQUIREMENTS

1984 and 1983 US Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.5	85.0	-0.5	86.8	86.4	0.4	87.6	86.8	0.8
20	86.6	86.5	0.1	88.2	87.9	0.3	89.0	88.5	0.5
30	87.6	87.4	0.2	89.2	89.0	0.2	90.1	89.5	0.6
40	88.5	88.2	0.3	90.2	89.9	0.3	91.0	90.4	0.6
50	89.3	89.0	0.3	91.0	90.6	0.4	92.0	91.3	0.7
60	89.9	89.9	0.0	91.8	91.3	0.5	93.0	92.1	0.9
70	90.7	90.7	0.0	92.8	92.2	0.6	94.0	93.1	0.9
80	91.7	91.6	0.1	94.0	93.5	0.5	95.3	94.8	0.5
90	93.0	92.7	0.3	95.8	95.8	0.0	97.0	97.7	-0.7
95	94.4	94.3	0.1	97.0	97.9	-0.9	98.6	100.3	-1.7
98	98.1	95.5	2.6	100.1	H	-	100.9	H	-
99	H	96.1	-	H	H	-	101.8	H	-

TABLE XV

COMPARISON OF MAXIMUM MOTOR OCTANE NUMBER REQUIREMENTS

1984 and 1983 US Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.5	85.0	-0.5	80.4	80.5	-0.1	79.1	78.4	0.7
20	86.6	86.5	0.1	81.4	81.6	-0.2	80.0	79.6	0.4
30	87.6	87.4	0.2	82.1	82.2	-0.1	80.6	80.3	0.3
40	88.5	88.2	0.3	82.7	82.7	0.0	81.3	80.9	0.4
50	89.3	89.0	0.3	83.3	83.2	0.1	82.0	81.5	0.5
60	89.9	89.9	0.0	83.8	83.7	0.1	82.6	81.9	0.7
70	90.7	90.7	0.0	84.4	84.2	0.2	83.2	82.5	0.7
80	91.7	91.6	0.1	85.1	85.1	0.0	84.1	83.7	0.4
90	93.0	92.7	0.3	86.4	86.5	-0.1	85.2	85.7	-0.5
95	94.4	94.3	0.1	87.1	88.0	-0.9	86.4	87.6	-1.2
98	98.1	95.5	2.6	89.6	H	-	88.2	H	-
99	H	96.1	-	H	H	-	89.0	H	-

TABLE XVI

COMPARISON OF MAXIMUM (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 and 1983 US Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.5	85.0	-0.5	83.6	83.4	0.2	83.3	82.6	0.7
20	86.6	86.5	0.1	84.8	84.7	0.1	84.5	84.1	0.4
30	87.6	87.4	0.2	85.7	85.6	0.1	85.4	84.9	0.5
40	88.5	88.2	0.3	86.5	86.3	0.2	86.1	85.7	0.4
50	89.3	89.0	0.3	87.2	86.9	0.3	87.0	86.4	0.6
60	89.9	89.9	0.0	87.8	87.5	0.3	87.8	87.0	0.8
70	90.7	90.7	0.0	88.6	88.2	0.4	88.6	87.8	0.8
80	91.7	91.6	0.1	89.6	89.3	0.3	89.7	89.2	0.5
90	93.0	92.7	0.3	91.1	91.1	0.0	91.1	91.7	-0.6
95	94.4	94.3	0.1	92.0	93.0	-1.0	92.5	93.9	-1.4
98	98.1	95.5	2.6	94.8	H	-	94.5	H	-
99	H	96.1	-	H	H	-	95.4	H	-

TABLE XVII

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 US Cars

Percent Satisfied	PR Fuels	FBRU Fuels			FBRSU Fuels		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	84.9	87.1	80.7	83.9	87.9	79.3	83.6
20	86.8	88.5	81.7	85.1	89.4	80.3	84.9
30	87.7	89.6	82.4	86.0	90.5	80.9	85.7
40	88.6	90.5	83.0	86.7	91.4	81.6	86.5
50	89.3	91.3	83.5	87.4	92.4	82.2	87.3
60	90.0	92.0	83.9	88.0	93.3	82.8	88.0
70	90.7	92.9	84.5	88.7	94.2	83.3	88.8
80	91.6	94.0	85.1	89.6	95.3	84.1	89.7
90	92.8	95.6	86.2	90.9	97.0	85.2	91.1
95	93.7	96.7	86.9	91.8	98.2	86.0	92.1
98	95.1	95.8	88.5	93.7	100.0	87.3	93.6
99	97.1	100.5	90.0	95.2	101.2	88.4	94.8

TABLE XVIII

COMPARISON OF MAXIMUM RESEARCH OCTANE NUMBER REQUIREMENTS

1984 and 1983 US Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.9	84.7	0.2	87.1	86.1	1.0	87.9	86.5	1.4
20	86.8	86.3	0.5	88.5	87.9	0.6	89.4	88.5	0.9
30	87.7	87.2	0.5	89.6	89.1	0.5	90.5	89.6	0.9
40	88.6	88.1	0.5	90.5	90.0	0.5	91.4	90.4	1.0
50	89.3	88.9	0.4	91.3	90.6	0.7	92.4	91.2	1.2
60	90.0	89.7	0.3	92.0	91.3	0.7	93.3	92.0	1.3
70	90.7	90.5	0.2	92.9	92.3	0.6	94.2	93.3	0.9
80	91.6	91.5	0.1	94.0	93.8	0.2	95.3	95.3	0.0
90	92.8	92.7	0.1	95.6	96.1	-0.5	97.0	98.1	-1.1
95	93.7	94.3	-0.6	96.7	98.6	-1.9	98.2	100.8	-2.6
98	95.1	95.6	-0.5	98.8	H	-	100.0	H	-
99	97.1	96.2	0.9	100.5	H	-	101.2	H	-

TABLE XIX

COMPARISON OF MAXIMUM MOTOR OCTANE NUMBER REQUIREMENTS

1984 and 1983 US Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.9	84.7	0.2	80.7	80.4	0.3	79.3	78.2	1.1
20	86.8	86.3	0.5	81.7	81.6	0.1	80.3	79.6	0.7
30	87.7	87.2	0.5	82.4	82.2	0.2	80.9	80.4	0.5
40	88.6	88.1	0.5	83.0	82.8	0.2	81.6	81.0	0.6
50	89.3	88.9	0.4	83.5	83.2	0.3	82.2	81.4	0.8
60	90.0	89.7	0.3	83.9	83.7	0.2	82.8	81.9	0.9
70	90.7	90.5	0.2	84.5	84.3	0.2	83.3	82.7	0.6
80	91.6	91.5	0.1	85.1	85.3	-0.2	84.1	84.0	0.1
90	92.8	92.7	0.1	86.2	86.8	-0.6	85.2	86.0	-0.8
95	93.7	94.3	-0.6	86.9	88.4	-1.5	86.0	88.0	-2.0
98	95.1	95.6	-0.5	88.5	H	-	87.3	H	-
99	97.1	96.2	0.9	90.0	H	-	88.4	H	-

TABLE XX

COMPARISON OF MAXIMUM (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 and 1983 US Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	84.9	84.7	0.2	83.9	83.3	0.6	83.6	82.4	1.2
20	86.8	86.3	0.5	85.1	84.7	0.4	84.9	84.0	0.9
30	87.7	87.2	0.5	86.0	85.7	0.3	85.7	85.0	0.7
40	88.6	88.1	0.5	86.7	86.4	0.3	86.5	85.7	0.8
50	89.3	88.9	0.4	87.4	86.9	0.5	87.3	86.3	1.0
60	90.0	89.7	0.3	88.0	87.5	0.5	88.0	87.0	1.0
70	90.7	90.5	0.2	88.7	88.3	0.4	88.8	88.0	0.8
80	91.6	91.5	0.1	89.6	89.6	0.0	89.7	89.6	0.1
90	92.8	92.7	0.1	90.9	91.4	-0.5	91.1	92.0	-0.9
95	93.7	94.3	-0.6	91.8	93.5	-1.7	92.1	94.4	-2.3
98	95.1	95.6	-0.5	93.7	H	-	93.6	H	-
99	97.1	96.2	0.9	95.2	H	-	94.8	H	-

TABLE XXI

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 Imported Vehicles

Percent Satisfied	PR Fuels	FBRU Fuels			FBRSU Fuels		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	83.0	84.3	78.5	81.4	85.7	77.8	81.8
20	84.6	85.5	79.4	82.4	86.7	78.5	82.6
30	86.0	86.5	80.2	83.4	87.4	79.0	83.2
40	87.5	88.0	81.3	84.7	88.0	79.4	83.7
50	88.2	88.9	81.9	85.4	89.6	80.4	85.0
60	88.8	89.5	82.3	85.9	90.8	81.2	86.0
70	89.5	90.2	82.8	86.5	91.7	81.8	86.8
80	90.7	91.4	83.6	87.5	93.4	82.8	88.1
90	93.1	95.1	85.8	90.5	95.8	84.4	90.1
95	94.1	97.5	87.5	92.5	97.8	85.8	91.8
98	95.2	98.8	88.5	93.7	H	H	H
99	96.0	99.3	89.0	94.2	H	H	H

TABLE XXII

COMPARISON OF MAXIMUM RESEARCH OCTANE NUMBER REQUIREMENTS

1984 and 1983 Imported Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	83.0	84.9	-1.9	84.3	86.7	-2.4	85.7	87.9	-2.2
20	84.6	87.6	-3.0	85.5	88.0	-2.5	86.7	89.4	-2.7
30	86.0	88.8	-2.8	86.5	89.5	-3.0	87.4	90.5	-3.1
40	87.5	89.7	-2.2	88.0	90.5	-2.5	88.0	91.3	-3.3
50	88.2	90.4	-2.2	88.9	91.3	-2.4	89.6	92.1	-2.5
60	88.8	91.3	-2.5	89.5	92.0	-2.5	90.8	92.8	-2.0
70	89.5	92.2	-2.7	90.2	93.1	-2.9	91.7	94.0	-2.3
80	90.7	93.8	-3.1	91.4	94.7	-3.3	93.4	95.5	-2.1
90	93.1	96.3	-3.2	95.1	96.5	-1.4	95.8	96.8	-1.0
95	94.1	97.5	-3.4	97.5	97.6	-0.1	97.8	97.8	0.0
98	95.2	H	-	98.8	H	-	H	H	-
99	96.0	H	-	99.3	H	-	H	H	-

TABLE XXIII

COMPARISON OF MAXIMUM MOTOR OCTANE NUMBER REQUIREMENTS

1984 and 1983 Imported Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	83.0	84.9	-1.9	78.5	80.7	-2.2	77.8	79.2	-1.4
20	84.6	87.6	-3.0	79.4	81.6	-2.2	78.5	80.3	-1.8
30	86.0	88.8	-2.8	80.2	82.5	-2.3	79.0	81.0	-2.0
40	87.5	89.7	-2.2	81.3	83.2	-1.9	79.4	81.5	-2.1
50	88.2	90.4	-2.2	81.9	83.7	-1.8	80.4	82.0	-1.6
60	88.8	91.3	-2.5	82.3	84.1	-1.8	81.2	82.4	-1.2
70	89.5	92.2	-2.7	82.8	84.8	-2.0	81.8	83.1	-1.3
80	90.7	93.8	-3.1	83.6	85.8	-2.2	82.8	84.2	-1.4
90	93.1	96.3	-3.2	85.8	87.0	-1.2	84.4	85.0	-0.6
95	94.1	97.5	-3.4	87.5	87.7	-0.2	85.8	85.8	0.0
98	95.2	H	-	88.5	H	-	H	H	-
99	96.0	H	-	89.0	H	-	H	H	-

TABLE XXIV

COMPARISON OF MAXIMUM (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 and 1983 Imported Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1984	1983	Δ	1984	1983	Δ	1984	1983	Δ
10	83.0	84.9	-1.9	81.4	83.7	-2.3	81.8	83.6	-1.8
20	84.6	87.6	-3.0	82.4	84.8	-2.4	82.6	84.9	-2.3
30	86.0	88.8	-2.8	83.4	86.0	-2.6	83.2	85.7	-2.5
40	87.5	89.7	-2.2	84.7	86.8	-2.1	83.7	86.4	-2.7
50	88.2	90.4	-2.2	85.4	87.5	-2.1	85.0	87.1	-2.1
60	88.8	91.3	-2.5	85.9	88.1	-2.2	86.0	87.6	-1.6
70	89.5	92.2	-2.7	86.5	88.9	-2.4	86.8	88.6	-1.8
80	90.7	93.8	-3.1	87.5	90.3	-2.8	88.1	89.8	-1.7
90	93.1	96.3	-3.2	90.5	91.7	-1.2	90.1	90.9	-0.8
95	94.1	97.5	-3.4	92.5	92.6	-0.1	91.8	91.8	0.0
98	95.2	H	-	93.7	H	-	H	H	-
99	96.0	H	-	94.2	H	-	H	H	-

TABLE XXV

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1984 US and Imported Knock-Sensor Vehicles Only

Percent Satisfied	PR Fuels	FBRU Fuels			FBRSU Fuels		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	82.4	84.0	78.3	81.2	85.3	77.5	81.4
20	85.4	87.1	80.7	83.9	87.6	79.2	83.4
30	86.7	88.2	81.4	84.8	89.1	80.1	84.6
40	87.5	89.4	82.2	85.8	90.1	80.7	85.4
50	89.0	90.3	82.8	86.5	91.0	81.3	86.2
60	90.0	90.9	83.3	87.1	91.9	82.0	87.0
70	90.7	91.9	83.8	87.9	93.0	82.6	87.8
80	91.4	93.4	84.8	89.1	94.9	83.8	89.3
90	92.4	95.3	86.0	90.7	96.9	85.1	91.0
95	94.1	97.6	87.8	92.7	98.9	86.6	92.8
98	96.7	100.4	89.9	95.2	100.6	87.9	94.3

TABLE XXVI

MAXIMUM OCTANE NUMBER REQUIREMENTS

All 1984 US and Imported Knock-Sensor Vehicles Only

PR Fuels

Knock Sensor, High (48 Vehicles)		Knock Sensor, Low (43 Vehicles)	
% Satisfaction (Midpoint)	RON	% Satisfaction (Midpoint)	RON
10	82.5	10	79.1
20	85.4	20	81.0
30	86.7	30	81.8
40	87.5	40	82.5
50	89.0	50	84.0
60	90.0	60	85.5
70	90.7	70	87.5
80	91.4	80	89.5
90	92.4	90	91.0
95	94.1	95	94.1
98	96.7	98	-

TABLE XXVII

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 US and Imported Knock Sensor Vehicles Only

FBRU Fuels

% Satisfaction (Midpoint)	Knock Sensor, High (48 Vehicles)			Knock Sensor, Low (43 Vehicles)		
	RON	MON	(R+M)/2	RON	MON	(R+M/2)
10	84.0	78.3	81.2	-	-	-
20	87.1	80.7	83.9	80.3	75.5	77.9
30	88.2	81.4	84.8	82.5	77.2	79.9
40	89.4	82.2	85.8	83.8	78.2	81.0
50	90.3	82.8	86.5	84.7	78.8	81.7
60	90.9	83.3	87.1	85.9	79.6	82.8
70	91.9	83.8	87.9	88.1	81.4	84.7
80	93.4	84.8	89.1	90.4	82.9	86.7
90	95.3	86.0	90.7	91.8	83.8	87.8
95	97.7	87.8	92.7	92.9	84.5	88.7
98	100.4	89.9	95.2	97.1	87.2	92.2

TABLE XXVIII

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 US and Imported Knock-Sensor Vehicles Only

FBRSU Fuels

% Satisfaction (Midpoint)	Knock Sensor, High (48 Vehicles)			Knock Sensor, Low (43 Vehicles)		
	RON	MON	(R+M)/2	RON	MON	(R+M/2)
10	85.3	77.5	81.4	78.1	72.0	75.0
20	87.7	79.2	83.4	81.8	75.1	78.5
30	89.1	80.1	84.6	84.2	76.6	80.4
40	90.1	80.7	85.4	85.0	77.3	81.2
50	91.0	81.3	86.2	85.7	77.8	81.8
60	91.9	82.0	87.0	86.8	78.5	82.7
70	93.0	82.6	87.8	89.1	80.1	84.6
80	94.9	83.8	89.3	91.3	81.5	86.4
90	96.9	85.1	91.0	93.2	82.7	88.0
95	98.9	86.6	92.8	94.8	83.8	89.3
98	100.6	87.9	94.3	99.8	87.3	93.6

TABLE XXIX

MAXIMUM OCTANE NUMBER REQUIREMENTS

All 1984 US and Imported Vehicles

PR FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (RON)	Knock Sensors, Low (RON)
10	84.1	82.8
20	86.2	85.1
30	87.4	86.9
40	88.3	88.0
50	89.0	88.7
60	89.7	89.5
70	90.5	90.3
80	91.6	91.3
90	93.0	93.0
95	94.3	94.4
98	97.3	97.4
99	-	-
No. of Vehicles	402	397

TABLE XXX

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 US and Imported Vehicles

FBRU FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (407 Vehicles)			Knock Sensors, Low (406 Vehicles)		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	85.8	79.6	82.7	84.3	78.5	81.4
20	87.6	81.0	84.3	86.7	80.3	83.5
30	88.7	81.8	85.3	88.2	81.4	84.8
40	89.7	82.4	86.0	89.2	82.1	85.7
50	90.5	83.0	86.7	90.2	82.7	86.5
60	91.4	83.5	87.5	91.1	83.4	87.2
70	92.4	84.2	88.3	92.0	83.9	88.0
80	93.7	85.0	89.4	93.4	84.8	89.1
90	95.8	86.4	91.1	95.6	86.2	90.9
95	97.2	87.3	92.2	97.0	87.1	92.0
98	99.7	89.3	94.5	99.3	88.9	94.1
99	100.7	90.2	95.5	-	-	-

TABLE XXXI

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 US and Imported Vehicles

FBRSU FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (403 Vehicles)			Knock Sensors, Low (403 Vehicles)		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	86.8	78.5	82.7	85.5	77.6	81.5
20	88.3	79.6	84.0	87.4	79.0	83.2
30	89.6	80.3	85.0	88.9	79.9	84.4
40	90.6	81.0	85.8	90.1	80.7	85.4
50	91.5	81.7	86.6	91.2	81.4	86.3
60	92.6	82.3	87.5	92.2	82.1	87.2
70	93.7	83.0	88.4	93.4	82.8	88.1
80	95.1	84.0	89.5	94.8	83.7	89.3
90	96.8	85.1	91.0	96.6	84.9	90.8
95	98.4	86.3	92.3	98.3	86.1	92.2
98	100.6	87.9	94.3	100.6	87.9	94.3
99	101.7	88.9	95.3	101.7	88.9	95.3

TABLE XXXII

MAXIMUM OCTANE NUMBER REQUIREMENTS

All 1984 US and Imported Cars

PR FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (RON)	Knock Sensors, Low (RON)
10	84.2	83.4
20	86.2	85.5
30	87.4	87.0
40	88.2	88.0
50	89.0	88.8
60	89.7	89.5
70	90.5	90.3
80	91.6	91.3
90	92.9	92.8
95	93.8	93.9
98	95.2	95.4
99	97.0	97.1
No. of Vehicles	368	363

TABLE XXXIII

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 US and Imported Cars

FBRU FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (373 Cars)			Knock Sensors, Low (373 Cars)		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	85.9	79.6	82.8	84.7	78.8	81.8
20	87.7	81.1	84.4	87.0	80.6	83.8
30	88.9	81.9	85.4	88.4	81.6	85.0
40	89.9	82.5	86.2	89.5	82.3	85.9
50	90.7	83.1	86.9	90.5	82.9	86.7
60	91.6	83.7	87.6	91.3	83.5	87.4
70	92.6	84.3	88.4	92.2	84.1	88.1
80	93.8	85.0	89.4	93.4	84.8	89.1
90	95.6	86.2	90.9	95.4	86.1	90.7
95	96.9	87.1	92.0	96.7	86.9	91.8
98	98.7	88.4	93.6	98.1	87.9	93.0
99	100.2	89.7	95.0	99.3	88.9	94.1

TABLE XXXIV

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 US and Imported Cars

FBRSU FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (369 Cars)			Knock Sensors, Low (369 Cars)		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	86.9	78.6	82.7	85.9	77.9	81.9
20	88.5	79.7	84.1	87.8	79.2	83.5
30	89.9	80.6	85.2	89.4	80.2	84.8
40	90.9	81.2	86.1	90.5	81.0	85.8
50	91.9	81.9	86.9	91.5	81.7	86.6
60	92.9	82.5	87.7	92.6	82.3	87.4
70	94.0	83.2	88.6	93.6	83.0	88.3
80	95.2	84.0	89.6	94.0	83.8	89.3
90	96.8	85.1	91.0	96.5	84.9	90.7
95	98.2	86.0	92.1	98.0	85.9	91.9
98	99.7	87.1	93.4	99.7	87.1	93.4
99	101.1	88.3	94.7	101.1	88.3	94.7

TABLE XXXV

MAXIMUM OCTANE NUMBER REQUIREMENTS

All 1984 US Vehicles

PR FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (RON)	Knock Sensors, Low (RON)
10	84.5	82.7
20	86.6	85.4
30	87.6	87.1
40	88.5	88.1
50	89.3	88.9
60	89.9	89.7
70	90.7	90.4
80	91.7	91.4
90	93.0	92.9
95	94.4	94.5
98	98.1	98.1
No. of Vehicles	340	335

TABLE XXXVI

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 US Vehicles

FBRU FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (345 Vehicles)			Knock Sensors, Low (344 Vehicles)		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	86.8	80.4	83.6	84.4	78.6	81.5
20	88.2	81.4	84.8	87.2	80.8	84.0
30	89.2	82.1	85.7	88.5	81.7	85.1
40	90.2	82.7	86.5	89.7	82.4	86.0
50	91.0	83.3	87.2	90.6	83.1	86.8
60	91.8	83.8	87.8	91.5	83.6	87.5
70	92.8	84.4	88.6	92.4	84.2	88.3
80	94.0	85.1	89.6	93.7	85.0	89.3
90	95.8	86.4	91.1	95.7	86.3	91.0
95	97.0	87.1	92.1	96.8	87.0	91.9
98	100.1	89.6	94.8	99.3	88.9	94.1

TABLE XXXVII

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 US Vehicles

FBRSU FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (341 Vehicles)			Knock Sensors, Low (341 Vehicles)		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	87.6	79.1	83.3	85.4	77.6	81.5
20	89.0	80.0	84.5	88.1	79.4	83.8
30	90.1	80.7	85.4	89.4	80.2	84.8
40	91.0	81.3	86.1	90.5	81.0	85.7
50	92.0	82.0	87.0	91.5	81.7	86.6
60	93.0	82.6	87.8	92.6	82.4	87.5
70	94.0	83.2	88.6	93.7	83.0	88.4
80	95.3	84.1	89.7	94.9	83.8	89.4
90	97.1	85.2	91.1	96.8	85.1	90.9
95	98.6	86.4	92.5	98.4	86.2	92.3
98	100.9	88.2	94.5	100.9	88.2	94.5
99	101.8	89.0	95.4	101.8	89.0	95.4

TABLE XXXVIII

MAXIMUM OCTANE NUMBER REQUIREMENTS

All 1984 US Cars

PR FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (RON)	Knock Sensors, Low (RON)
10	84.9	83.8
20	86.8	86.1
30	87.7	87.3
40	88.6	88.2
50	89.3	89.1
60	90.0	89.7
70	90.7	90.5
80	91.6	91.4
90	92.8	92.7
95	93.7	93.7
98	95.1	95.4
99	97.1	97.2
No. of Vehicles	311	306

TABLE XXXIX

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 US Cars

FBRU FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (316 Cars)			Knock Sensors, Low (316 Cars)		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	87.1	80.7	83.9	85.5	79.3	82.4
20	88.5	81.7	85.1	87.8	81.1	84.4
30	89.6	82.4	86.0	89.0	82.0	85.5
40	90.5	83.0	86.7	90.1	82.7	86.4
50	91.3	83.5	87.4	91.0	83.3	87.1
60	92.0	83.9	88.0	91.7	83.7	87.7
70	92.9	84.5	88.7	92.5	84.3	88.4
80	94.0	85.1	89.6	93.7	84.9	89.3
90	95.6	86.2	90.9	95.4	86.1	90.8
95	96.7	86.9	91.8	96.5	86.8	91.7
98	98.8	88.5	93.7	97.7	87.6	92.7
99	100.5	90.0	95.3	99.2	88.8	94.0

TABLE XL

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 US Cars

FBRSU FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (312 Cars)			Knock Sensors, Low (312 Cars)		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	87.9	79.3	83.6	86.2	78.2	82.2
20	89.4	80.3	84.9	88.7	79.8	84.2
30	90.5	80.9	85.7	90.0	80.6	85.3
40	91.4	81.6	86.5	90.9	81.3	86.1
50	92.4	82.2	87.3	92.0	82.0	87.0
60	93.3	82.8	88.0	92.9	82.6	87.7
70	94.2	83.3	88.8	93.9	83.1	88.5
80	95.3	84.1	89.7	94.9	83.9	89.4
90	97.0	85.2	91.1	96.7	85.0	90.8
95	98.2	86.0	92.1	97.9	85.9	91.9
98	100.0	87.3	93.6	99.9	87.3	93.6
99	101.2	88.4	94.8	101.2	88.4	94.8

TABLE XLI

MAXIMUM OCTANE NUMBER REQUIREMENTS

All 1984 Imported Vehicles

PR FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (RON)	Knock Sensors, Low (RON)
10	83.0	83.0
20	84.6	84.6
30	86.0	85.9
40	87.5	87.5
50	88.2	88.2
60	88.8	88.8
70	89.5	89.5
80	90.7	90.7
90	93.1	93.1
95	94.1	94.1
98	95.2	95.2
99	96.0	96.0
No. of Vehicles	62	62

TABLE XLII

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 Imported Vehicles

FBRU FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (62 Vehicles			Knock Sensors, Low (62 Vehicles)		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	84.3	78.5	81.4	84.3	78.5	81.4
20	85.5	79.4	82.5	85.5	79.4	82.4
30	86.5	80.2	83.4	86.5	80.1	83.3
40	88.0	81.3	84.7	88.0	81.3	84.7
50	88.9	81.9	85.4	88.9	81.9	85.4
60	89.5	82.3	85.9	89.5	82.3	85.9
70	90.2	82.8	86.5	90.2	82.8	86.5
80	91.4	83.6	87.5	91.4	83.6	87.5
90	95.1	85.9	90.5	95.1	85.9	90.5
95	97.5	87.5	92.5	97.5	87.5	92.5
98	98.8	88.5	93.7	98.8	88.5	93.7
99	99.3	89.0	94.2	99.3	89.0	94.2

TABLE XLIII

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

All 1984 Imported Vehicles

FBRSU FUELS

% Satisfaction (Midpoint)	Knock Sensors, High (62 Vehicles			Knock Sensors, Low (62 Vehicles)		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	85.7	77.8	81.8	85.6	77.8	81.7
20	86.7	78.5	82.6	86.7	78.5	82.6
30	87.4	79.0	83.2	87.4	79.0	83.2
40	88.0	79.4	83.7	88.0	79.4	83.7
50	89.6	80.4	85.0	89.6	80.4	85.0
60	90.8	81.2	86.0	90.8	81.2	86.0
70	91.7	81.8	86.8	91.7	81.8	86.8
80	93.4	82.8	88.1	93.4	82.8	88.1
90	95.8	84.4	90.1	95.8	84.4	90.1
95	97.8	85.8	91.8	97.8	85.8	91.8

TABLE XLIV

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

Model	No. Tested	PR	Research Octane No.		Motor Octane No.		(R+M)/2 Octane No.	
			FBRU	FBRSU	FBRU	FBRSU	FBRU	FBRSU
		----------50% Satisfied----------						
KED F22A3/DED F22A3	13	89.5	91.5	92.9	83.6	82.6	87.5	87.7
PKC 222A3/KKC 222A3/ DKC 222A3	14	87.3	89.8	91.5	82.4	81.6	86.1	86.6
OCR 123A3/MCR 123A3	25	88.8	90.3	91.0	82.8	81.3	86.6	86.6
IAE 230A3/LAE 230A3								
Max ONR (High Borderline)	14	85.8	88.0	89.5	81.2	80.3	84.6	84.9
Min ONR (Low Borderline)	14	84.5	85.5	86.9	79.5	78.5	82.5	82.7
NAR F25A3/HAR F25A3/ IAR F25A3/LAR F25A3	12	89.3	92.5	93.6	84.2	83.0	88.4	88.3
NAX 228A3/HAX 228A3	13	88.7	91.7	93.1	83.7	82.6	87.7	87.9
NBH 450A4/HBH 450A4	12	90.4	93.8	94.3	85.0	83.4	89.4	88.9
NJP F20A3/IJP F20A3/ LJP F20A3	16	90.2	92.5	93.9	84.3	83.2	88.4	88.5

TABLE XLIV
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

Model	No. Tested	PR	Research Octane No.		Motor Octane No.		(R+M)/2 Octane No.	
			FBRU	FBRSU	FBRU	FBRSU	FBRU	FBRSU
		----------90% Satisfied----------						
KED F22A3/DED F22A3	13	92.7	95.3	97.1	86.0	85.3	90.7	91.2
PKC 222A3/KKC 222A3/ DKC 222A3	14	90.8	94.6	96.6	85.7	85.0	90.1	90.8
OCR 123A3/MCR 123A3	25	93.0	94.8	96.1	85.9	84.8	90.3	90.5
IAE 230A3/LAE 230A3								
Max ONR (High Borderline)	14	90.7	92.6	94.0	84.4	83.3	88.5	88.7
Min ONR (Low Borderline)	14	87.0	89.7	90.7	82.5	81.2	86.1	85.9
NAR F25A3/HAR F25A3/ IAR F25A3/LAR F25A3	12	93.2	96.1	97.6	86.6	85.7	91.4	91.6
NAX 228A3/HAX 228A3	13	92.5	94.8	96.1	85.7	84.6	90.3	90.3
NBH 450A4/HBH 450A4	12	93.9	96.1	97.1	86.6	85.3	91.4	91.4
NJP F20A3/IJP F20A3/ LJP F20A3	16	95.2	98.5	100.1	88.3	87.4	93.4	93.7

TABLE XLV

OWNER/RATER COMPARISON OF TANK FUEL KNOCK

(1977-1984 CRC Octane Number Requirement Surveys)

	1984	1983	1982	1981	1980	1979	1978	1977
Fuel:	Unleaded	Unleaded	Unleaded	Unleaded	Unleaded*	Unleaded*	Unleaded*	Unleaded*
No. of Reports:	149	129	144	149	218	196	105	225
% Knocking								
Trained Rater	51.7	59.7	47.9	43.6	51.1	52.6	50.5	54.7
Owner	26.2	29.5	25.0	29.5	31.2	26.0	32.4	29.3
Owner/Rater Ratio	0.51	0.49	0.52	0.68	0.61	0.49	0.64	0.54
% Owners Objecting								
Based on Total Reports	7.4	12.4	13.2	12.1	15.1	15.8	15.2	10.2
Based on Those Reporting Knock	28.2	42.1	52.8	40.9	48.5	60.8	46.9	34.8

* Some vehicles were designed for leaded fuels.

TABLE XLVI

TANK-FUEL KNOCK REPORTED BY TRAINED OBSERVERS

I. US and Imported Vehicles

Model Year	No. in Survey	Vehicles Tested on Tank Fuel: No. Tested	No. Knocking	% Knocking (Wtg. Avg.)
1984	407	358	--	49.3
1983	383	314	--	44.6
1982	434	342	--	41.6
1981	417	326	--	42.9
1980	429	374	--	49.9
1979	490	414	--	47.3
1978	434	338	--	47.2
1977	478	457	--	44.2

II. 1984 Select Models

				% Knocking
IAE 230A3/LAE 230A3 (Knock Sensor, Max. [high])	14	13	5	38.5
NAR F25A3/HAR F25A3/ IAR F25A3/LAR F25A3	12	11	8	72.7
NAX 228A3/HAX 228A3	13	10	6	60.0
NBH 450A4/HBH 450A4	12	10	8	80.0
NJP F20A3/IJP F20A3/ LJP F20A3	16	15	11	73.3
OCR 123A3/MCR 123A3	25	22	10	45.5
KED F22A3/DED F22A3	13	12	7	58.3
PKC 222A3/KKC 222A3/ DKD 222A3	14	12	7	58.3

TABLE XLVII

ENGINE SPEEDS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

Percent of Cars Having Maximum Requirements Within Specified Speed (rpm) Ranges

	Model:	IAE 230A3/LAE 230A3 Knock Sensor, Max. (High)			IAE 230A3/LAE 230A3 Knock Sensor, Min. (Low)			NAR F25A3/HAR F25A3/ IAR F25A3/LAR F25A3		
	Fuel:	PR	FBRU	FBRSU	PR	FBRU	FBRSU	PR	FBRU	FBRSU
SPEED RANGE										
1599 and Lower				7				17	33	25
1600 - 1999		29	14	21	33	21	21	33	33	25
2000 - 2399		29	57	29	34	50	36	8	17	
2400 - 2799		35	29	43	25	29	43	25	17	25
2800 - 3199		7			8			17		25
3200 and Higher										
No. of Cars		14	14	14	12	14	14	12	12	12

	Model:	NAX 228A3/HAX 228A3			NBH 450A4/HBH 450A4			NJP F20A3/IJP F20A3/ LJP F20A3		
	Fuel:	PR	FBRU	FBRSU	PR	FBRU	FBRSU	PR	FBRU	FBRSU
SPEED RANGE										
1599 and Lower		23	15	8	58	42	50	7	6	6
1600 - 1999		31	39	23	42	33	25			
2000 - 2399		23	38	53				7	6	12
2400 - 2799		23	8	8		8		26	38	38
2800 - 3199				8		17	17	60	50	44
3200 and Higher							8			
No. of Cars		13	13	13	12	12	12	15	16	16

TABLE XLVII
(Continued)

ENGINE SPEEDS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

Percent of Cars Having Maximum Requirements Within Specified Speed (rpm) Ranges

Model:	OCR 123A3/ MCR 123A3			KED F22A3/DED F22A3			PKC 222A3/KKC 222A3/ DKC 222A3		
Fuel:	PR	FBRU	FBRSU	PR	FBRU	FBRSU	PR	FBRU	FBRSU
SPEED RANGE									
1599 and Lower	16	4	8	8					
1600 - 1999	24	32	20	8	15	15			
2000 - 2399	44	20	12	46	39	23	8	21	15
2400 - 2799	8	24	28	30	23	39	77	36	31
2800 - 3199	8	12	24		8	8	15	29	39
3200 and Higher		8	8	8	15	15		14	15
No. of Cars	25	25	25	13	13	13	13	14	13

TABLE XLVIII

ENGINE SPEEDS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS

Weighted % of Vehicles Having Requirements in Indicated (rpm) Ranges

All 1984 Vehicles

Maximum Requirements Engine Speed Range	PR Fuels	FBRU Fuels	FBRSU Fuels
1599 and Lower	19.6	21.2	17.5
1600 - 1999	27.8	21.9	19.3
2000 - 2399	23.0	24.5	22.0
2400 - 2799	16.1	14.5	17.3
2800 - 3199	11.1	12.2	14.8
3200 - 3599	1.7	3.9	5.6
3600 and Higher	0.7	1.8	3.5

TABLE XLIX

ROAD OCTANE DEPRECIATION OF 1984 FBRU AND FBRSU FUELS

All 1984 Vehicles

Includes Maximum (High Borderline) Requirements
for Knock Sensor-Equipped Vehicles

	FBRU Fuels				FBRSU Fuels			
RON	% Satisfied	Sensi-tivity	Road Octane Rating	Depre-ciation	% Satisfied	Sensi-tivity	Road Octane Rating	Depre-ciation
85	7.4	6.0	83.3	1.7	4.0	7.7	82.0	3.0
86	10.6	6.3	84.2	1.8	6.7	8.0	83.1	2.9
87	16.0	6.4	85.4	1.6	11.2	8.3	84.3	2.7
88	23.0	6.7	86.6	1.4	17.6	8.6	85.7	2.3
89	32.8	7.0	87.7	1.3	25.1	9.0	86.9	2.1
90	43.8	7.4	88.6	1.4	34.1	9.4	87.8	2.2
91	55.8	7.7	89.5	1.5	44.6	9.7	88.6	2.4
92	66.5	8.1	90.2	1.8	54.8	10.0	89.4	2.6
93	74.9	8.4	91.0	2.0	63.9	10.4	90.0	3.0
94	81.6	8.9	91.7	2.3	72.3	10.8	90.8	3.2
95	86.4	9.2	92.4	2.6	79.4	11.1	91.5	3.5
96	90.8	9.5	93.3	2.7	86.2	11.4	92.4	3.6
97	94.6	9.9	94.2	2.8	90.7	11.8	93.2	3.8
98	96.2	10.2	94.9	3.1	94.0	12.1	94.0	4.0
99	97.2	10.3	95.8	3.2	96.1	12.3	94.8	4.2

FIGURE 1

DISTRIBUTION OF ODOMETER MILEAGE FOR 1984 MODEL VEHICLES TESTED

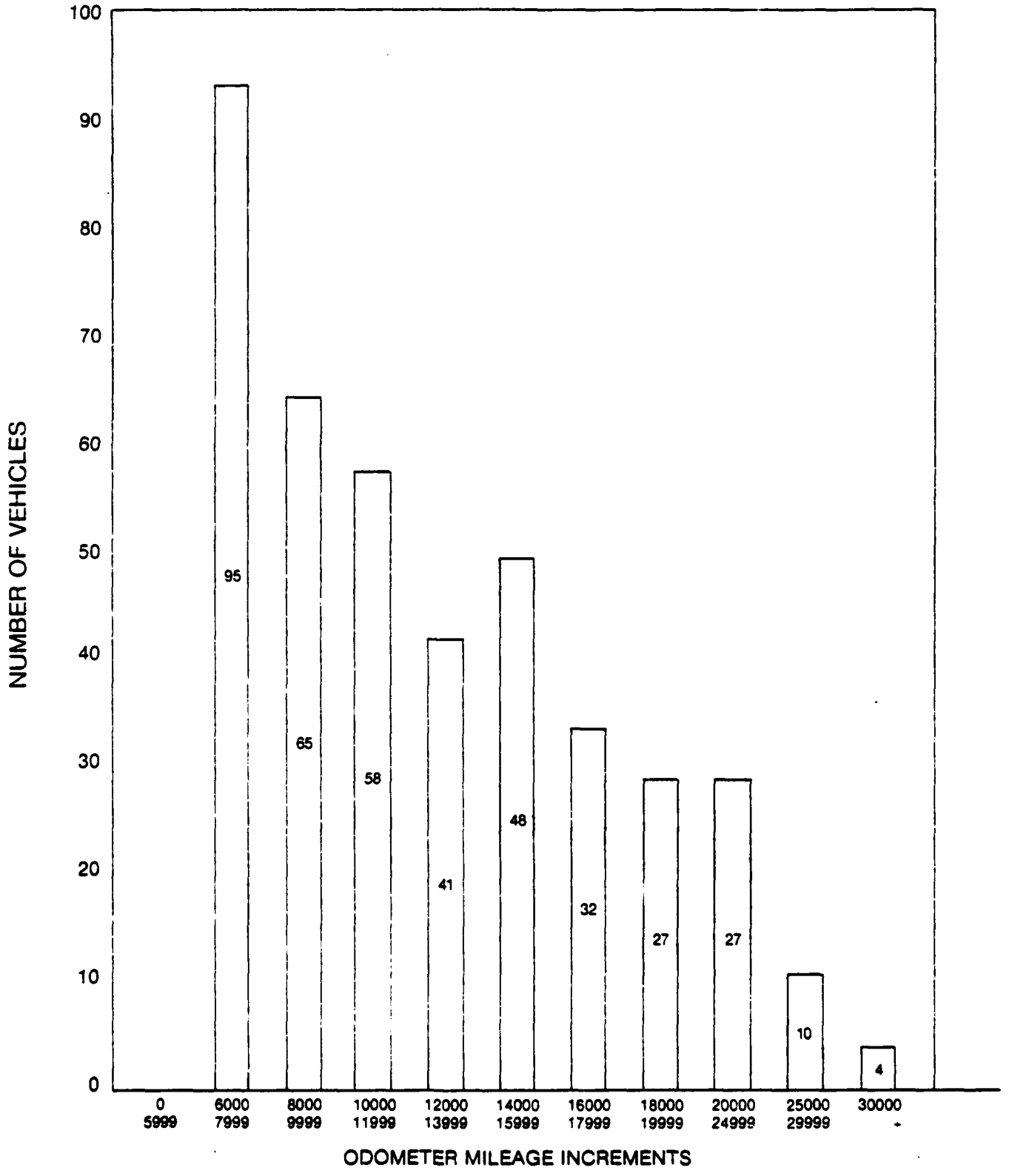


FIGURE 2a

DISTRIBUTION OF MAXIMUM PR FUEL REQUIREMENTS
1984 U.S. AND IMPORTED VEHICLES

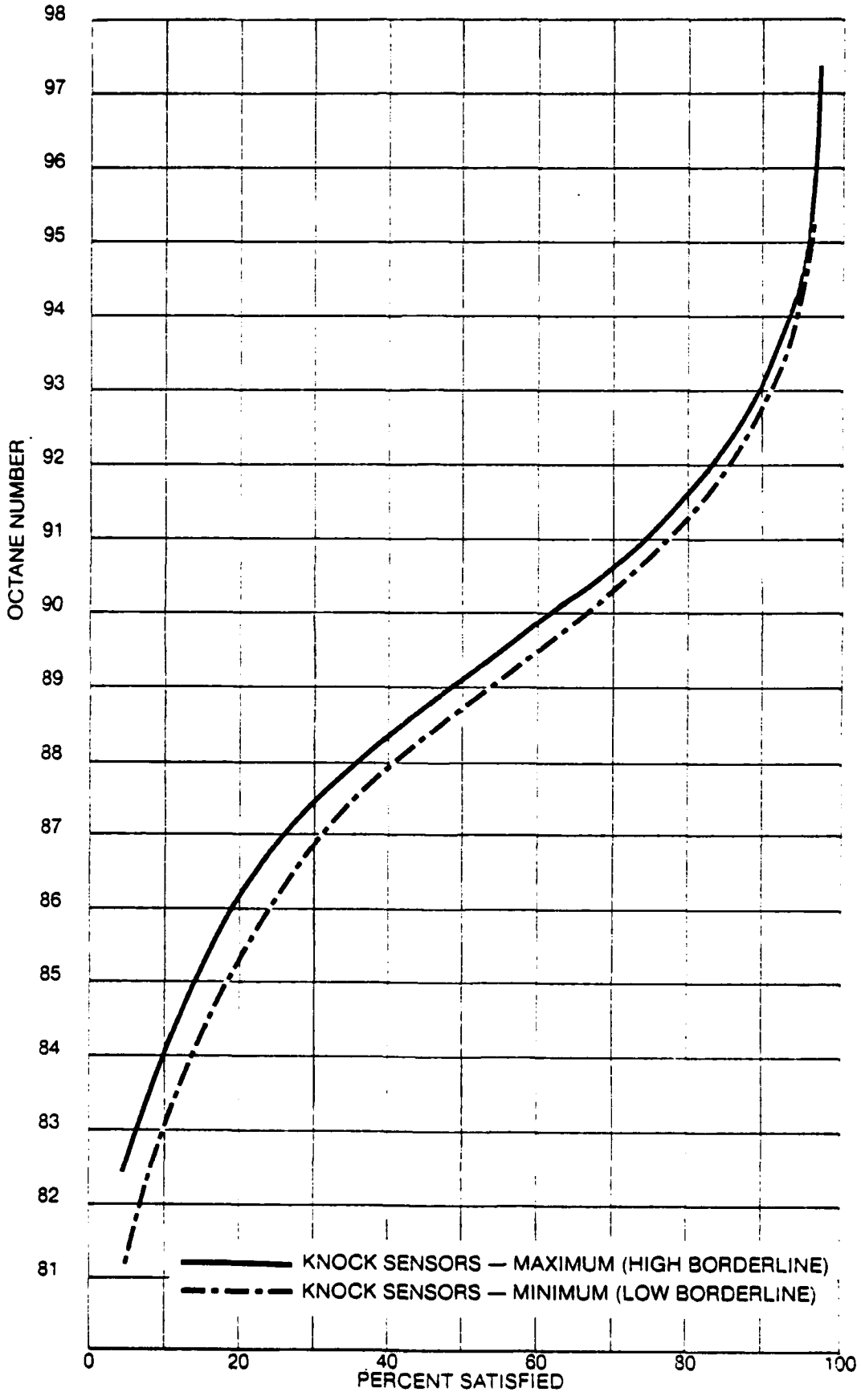


FIGURE 2b

DISTRIBUTION OF MAXIMUM PR FUEL REQUIREMENTS
1984 U.S. AND IMPORTED VEHICLES

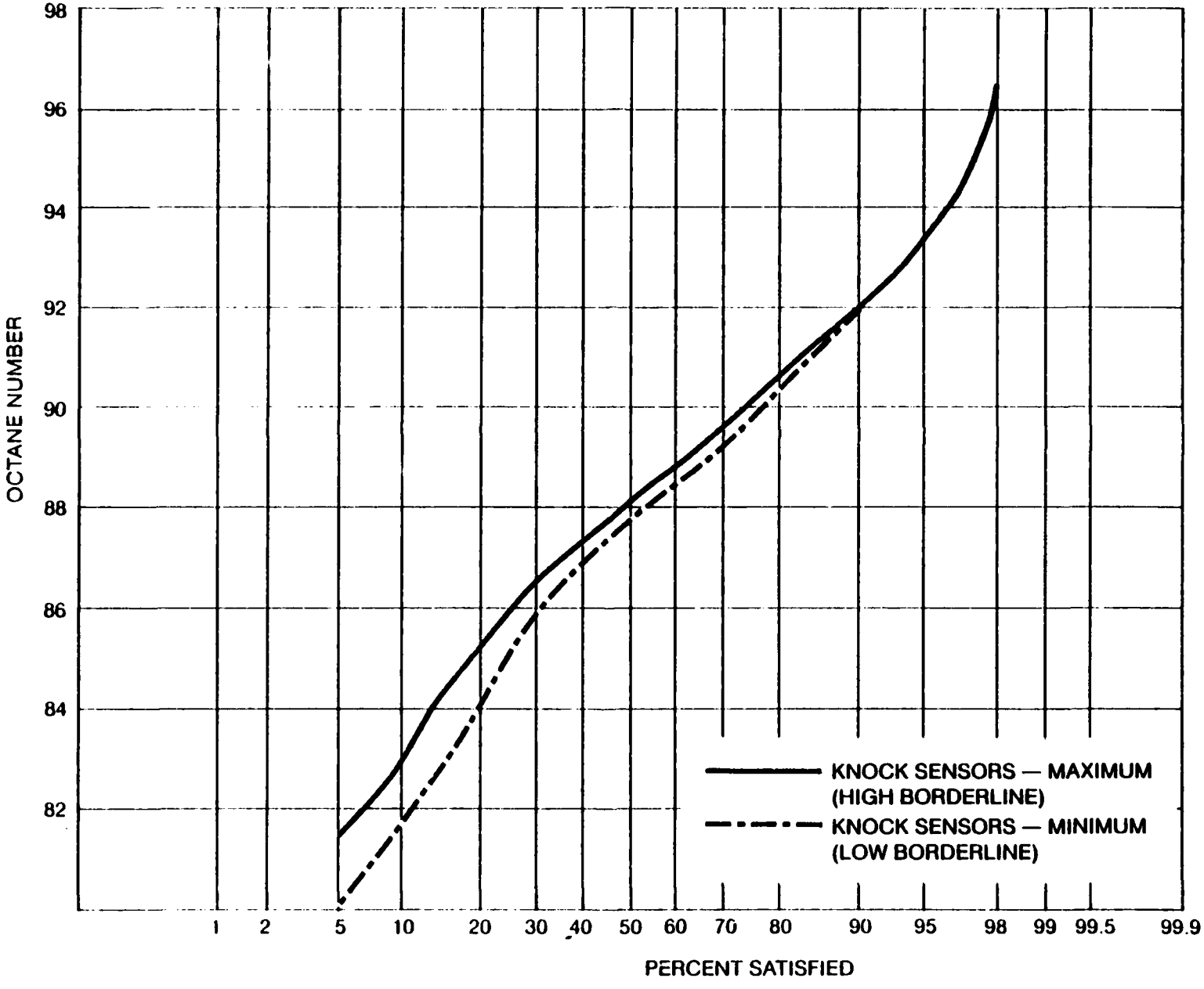


FIGURE 3a

DISTRIBUTION OF MAXIMUM FBRU RON REQUIREMENTS
1984 U.S. AND IMPORTED VEHICLES

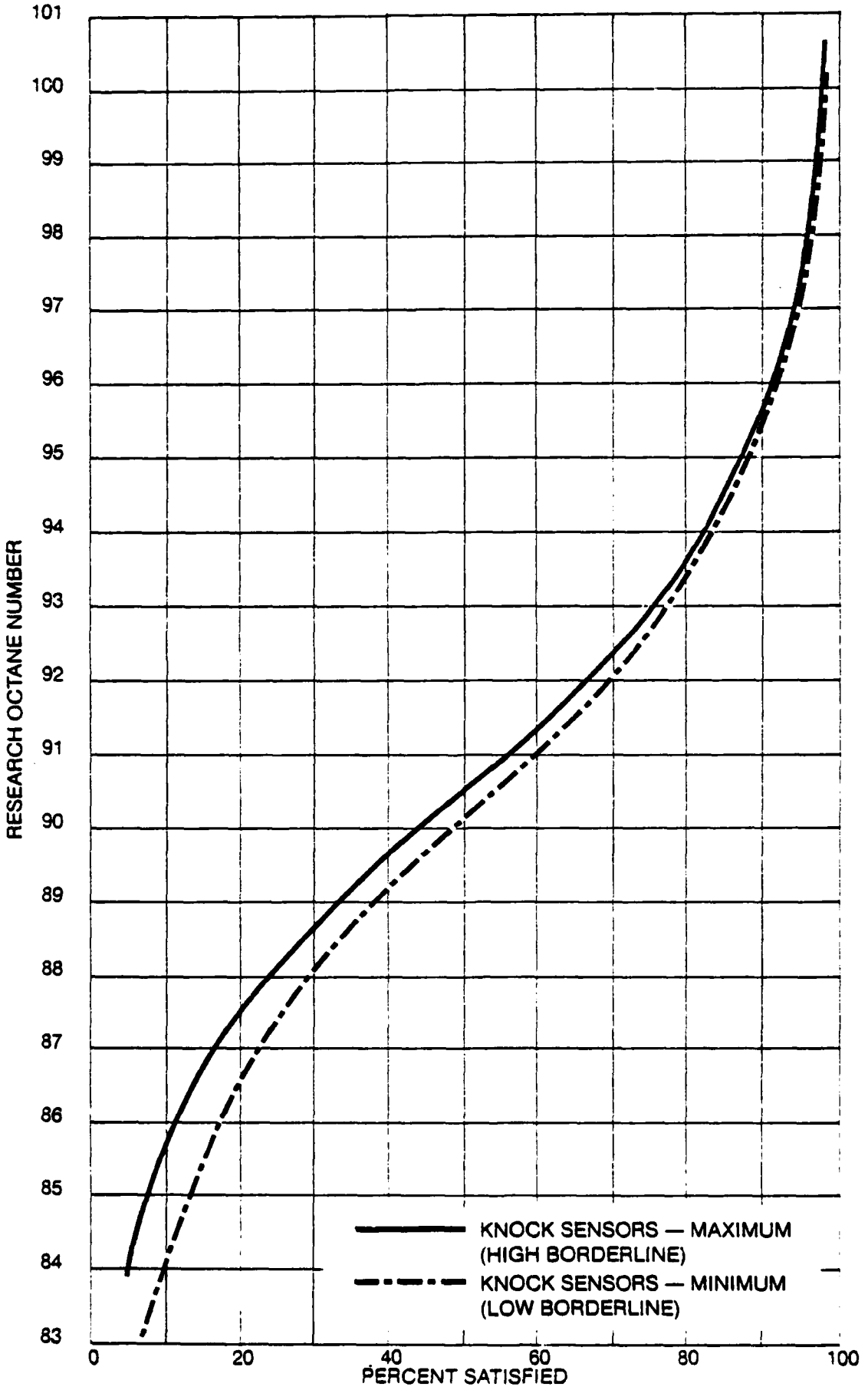


FIGURE 3b

DISTRIBUTION OF MAXIMUM FBRU RON REQUIREMENTS
1984 U.S. AND IMPORTED VEHICLES

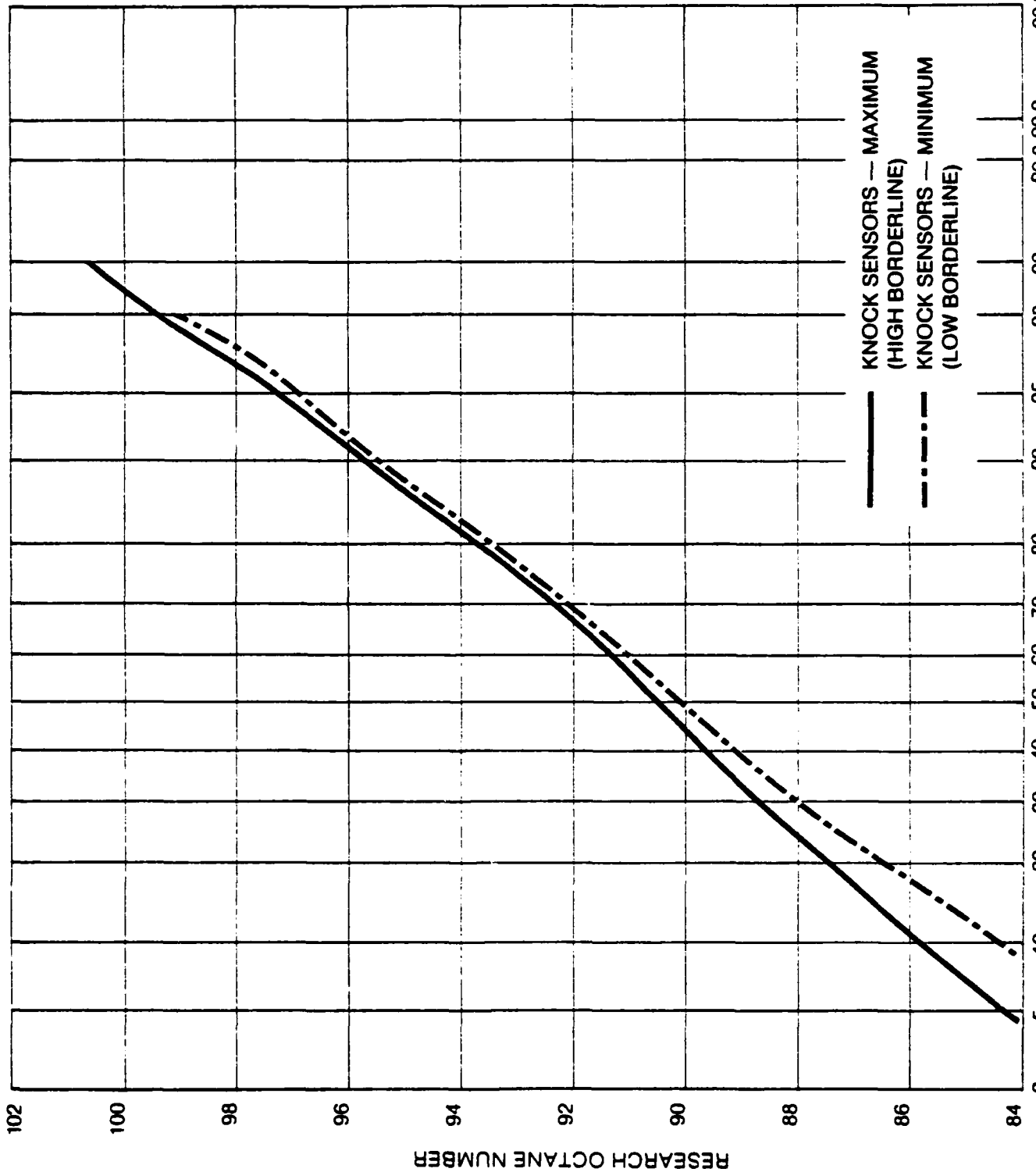


FIGURE 4a

DISTRIBUTION OF MAXIMUM FBRSU RON REQUIREMENTS
1984 U.S. AND IMPORTED VEHICLE

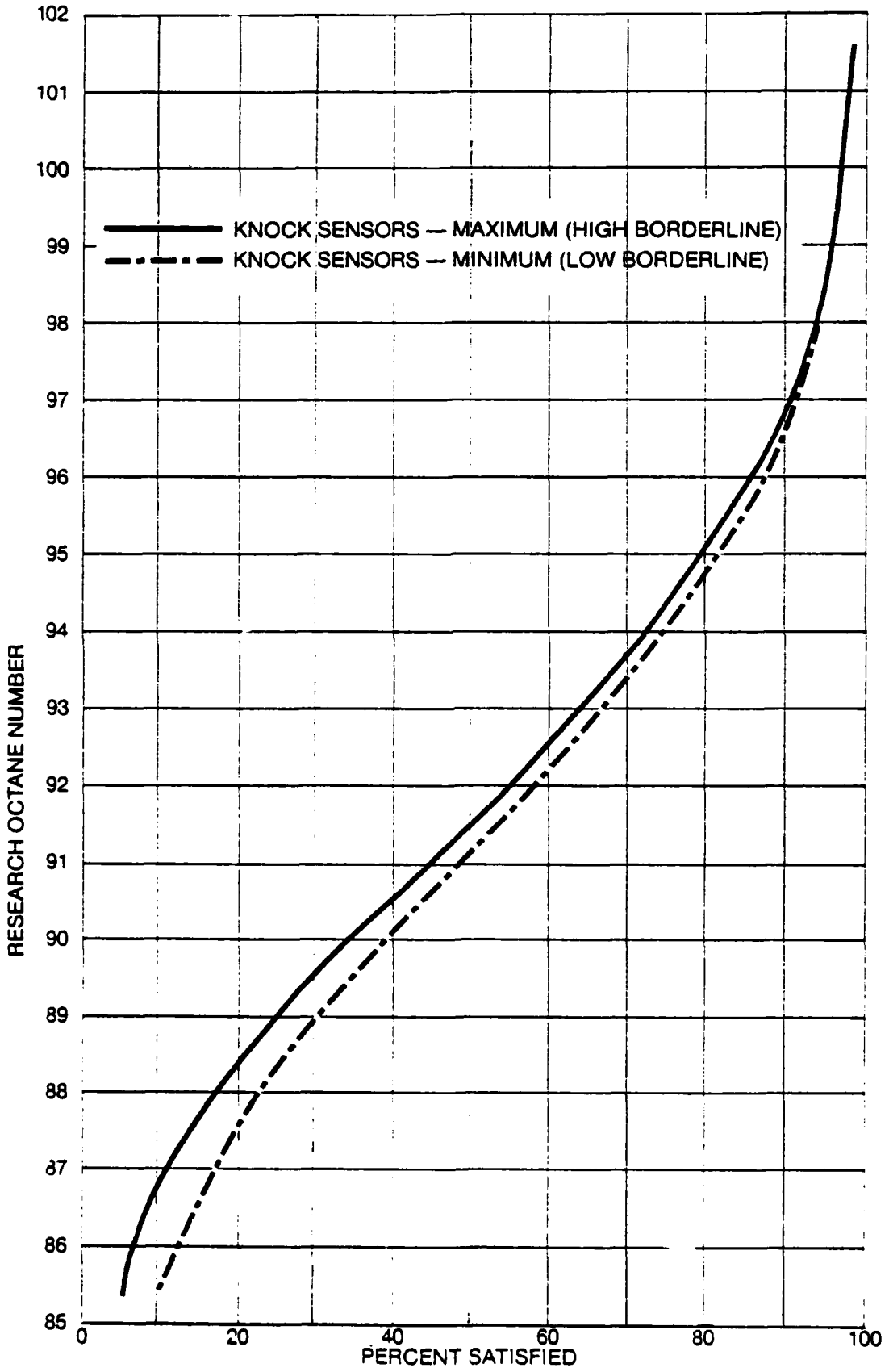


FIGURE 4b

DISTRIBUTION OF MAXIMUM FBRSU RON REQUIREMENTS
1984 U.S. AND IMPORTED VEHICLES

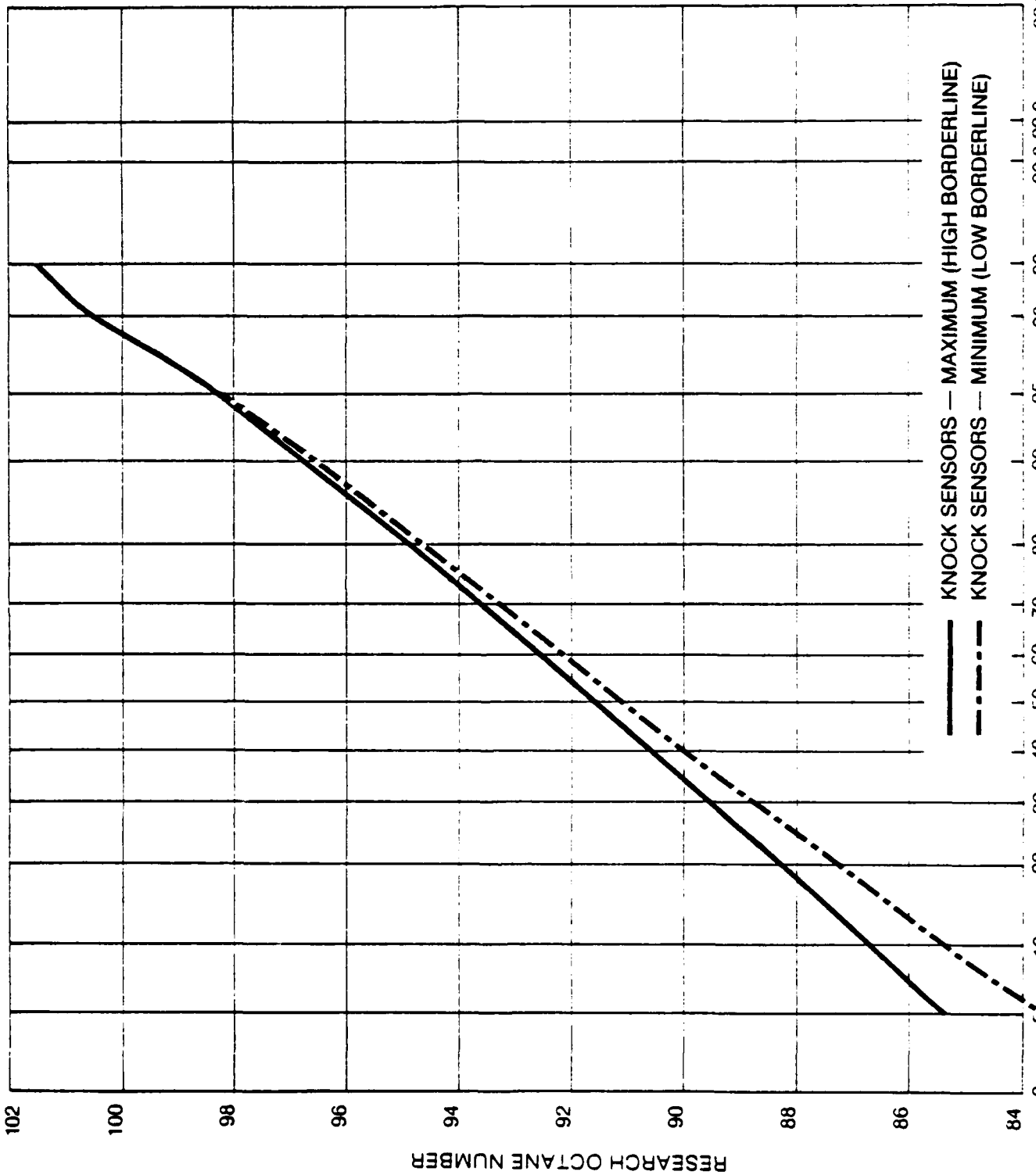
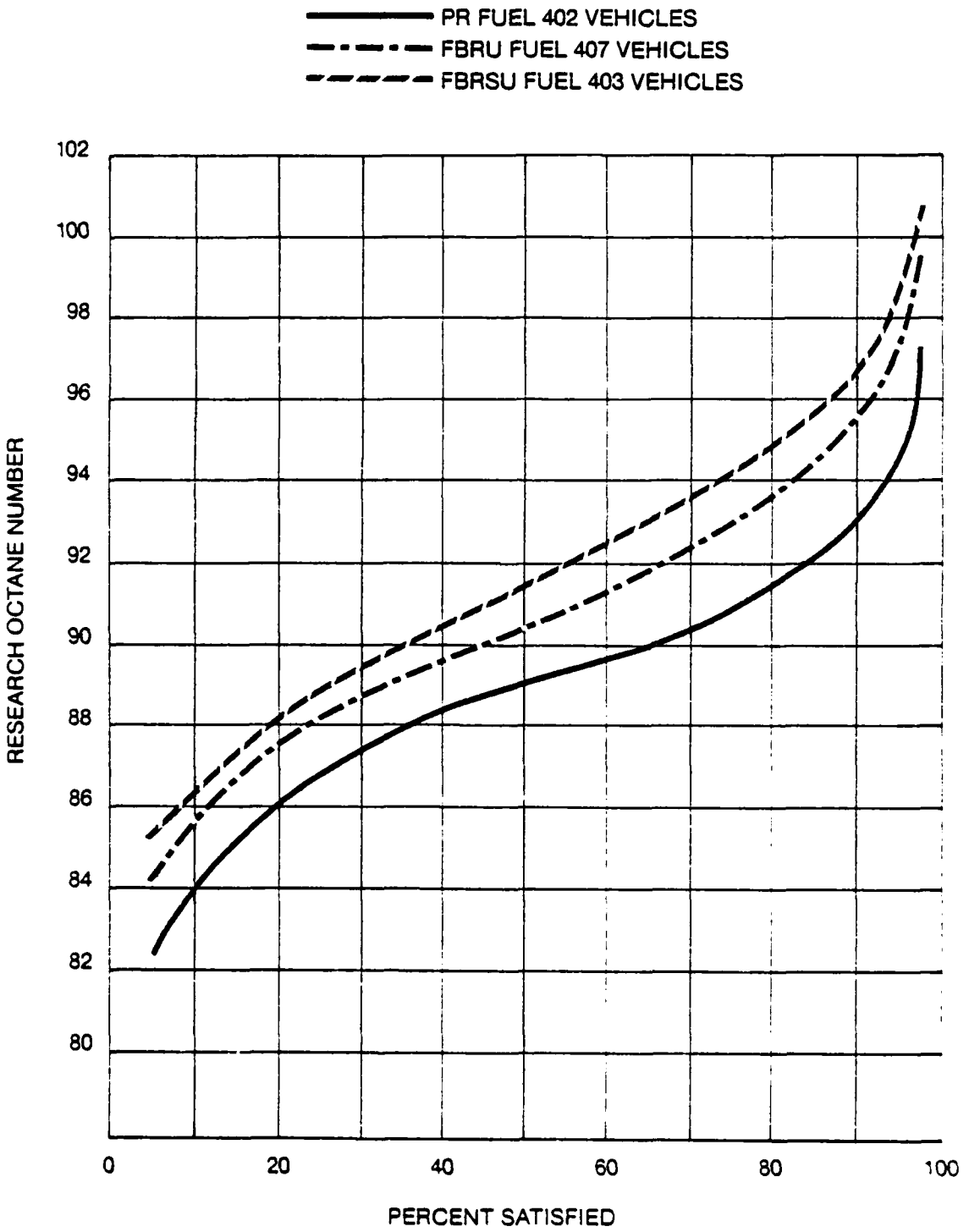


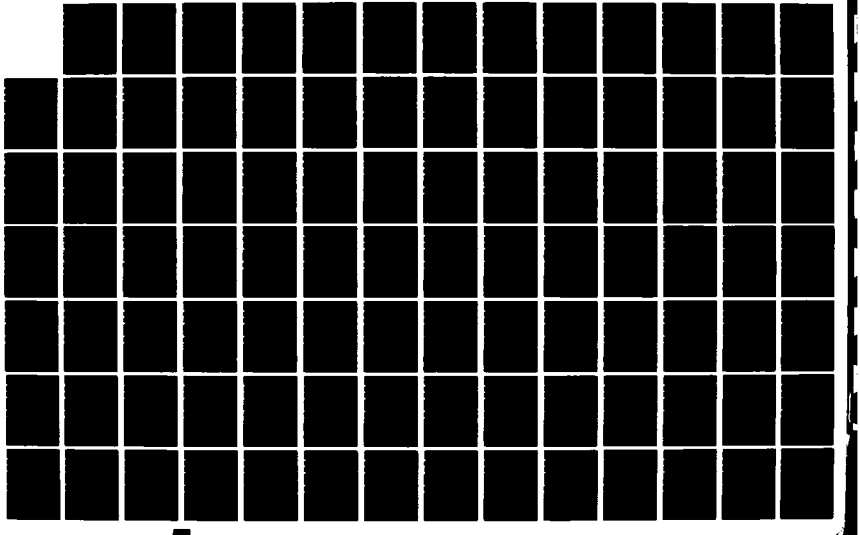
FIGURE 5a

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS 1984 U.S. AND IMPORTED VEHICLES



AD-A164 454 1984 CRC (COORDINATING RESEARCH COUNCIL) OCTANE NUMBER 2/3
REQUIREMENT SURVEY(U) COORDINATING RESEARCH COUNCIL INC
ATLANTA GA DEC 85 CRC-544

UNCLASSIFIED F/G 21/4 NL



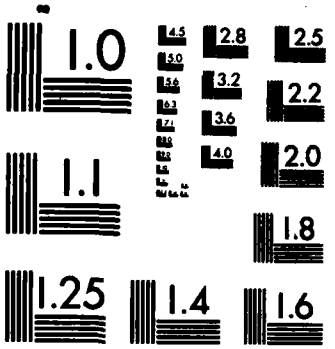


FIGURE 5b

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1984 U.S. AND IMPORTED VEHICLES

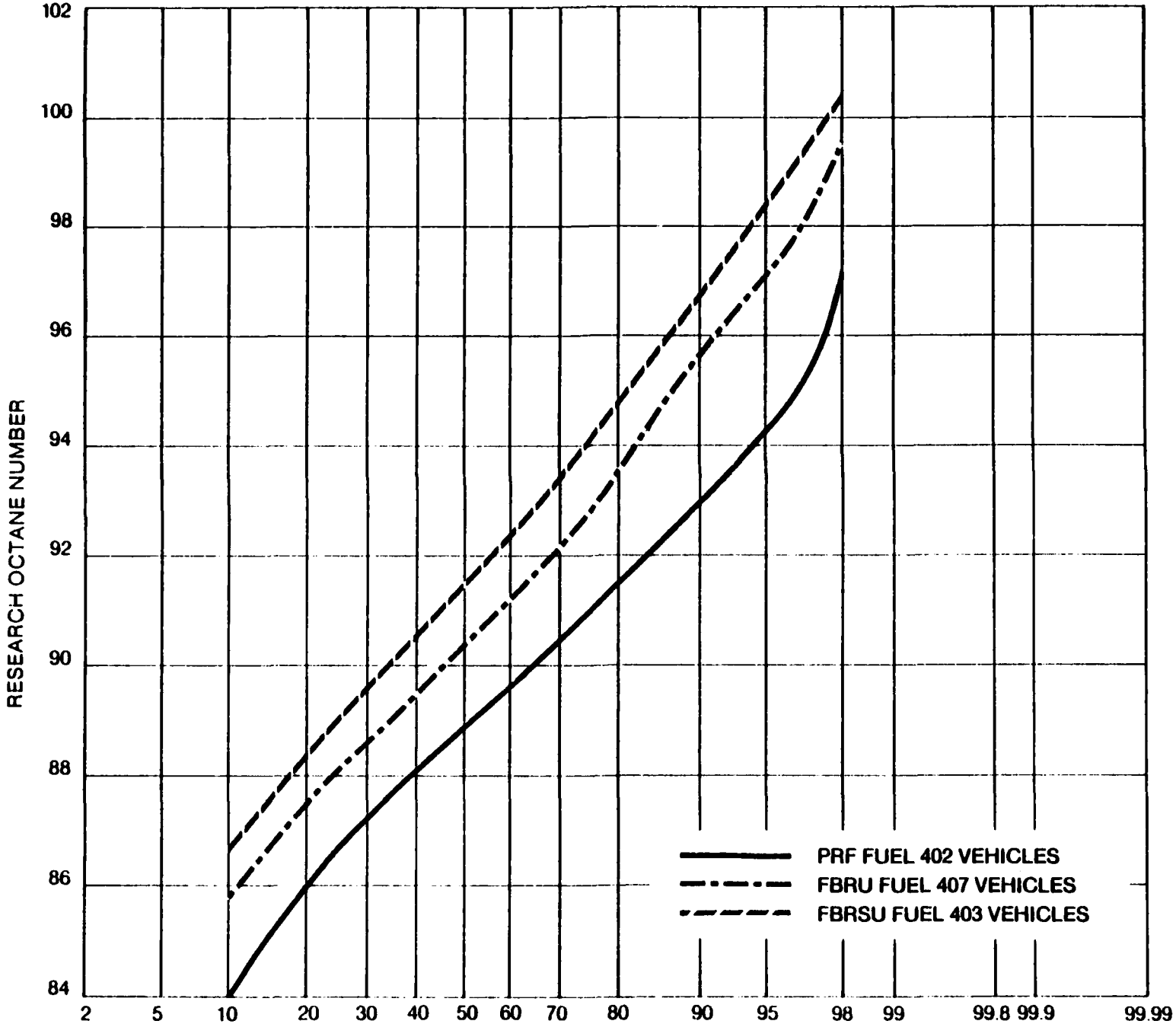


FIGURE 6

COMPARISON OF MAXIMUM PR FUEL REQUIREMENTS 1984 AND 1983 U.S. AND IMPORTED VEHICLES

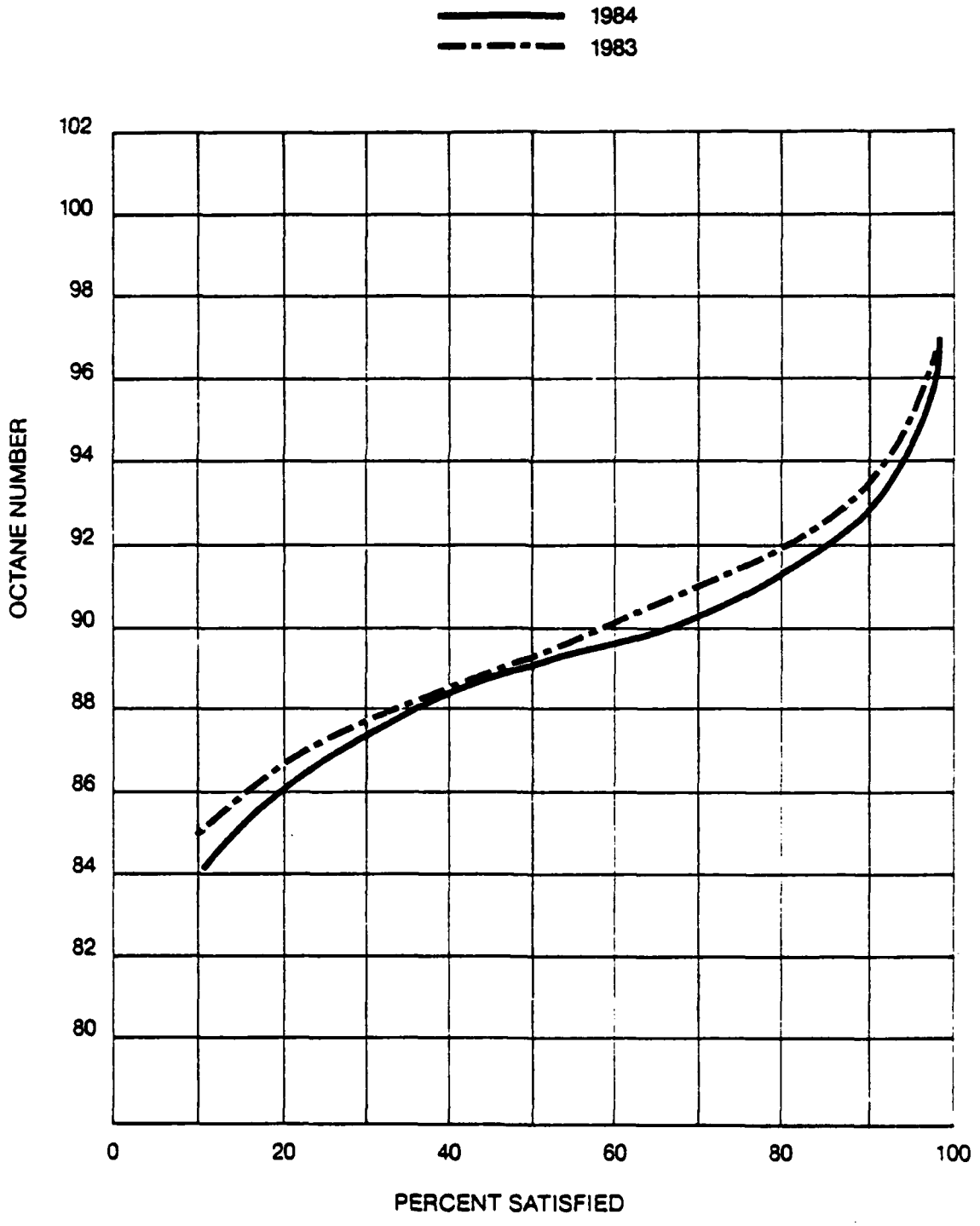


FIGURE 7

COMPARISON OF MAXIMUM FBRU FUEL REQUIREMENTS
1984 AND 1983 U.S. AND IMPORTED VEHICLES

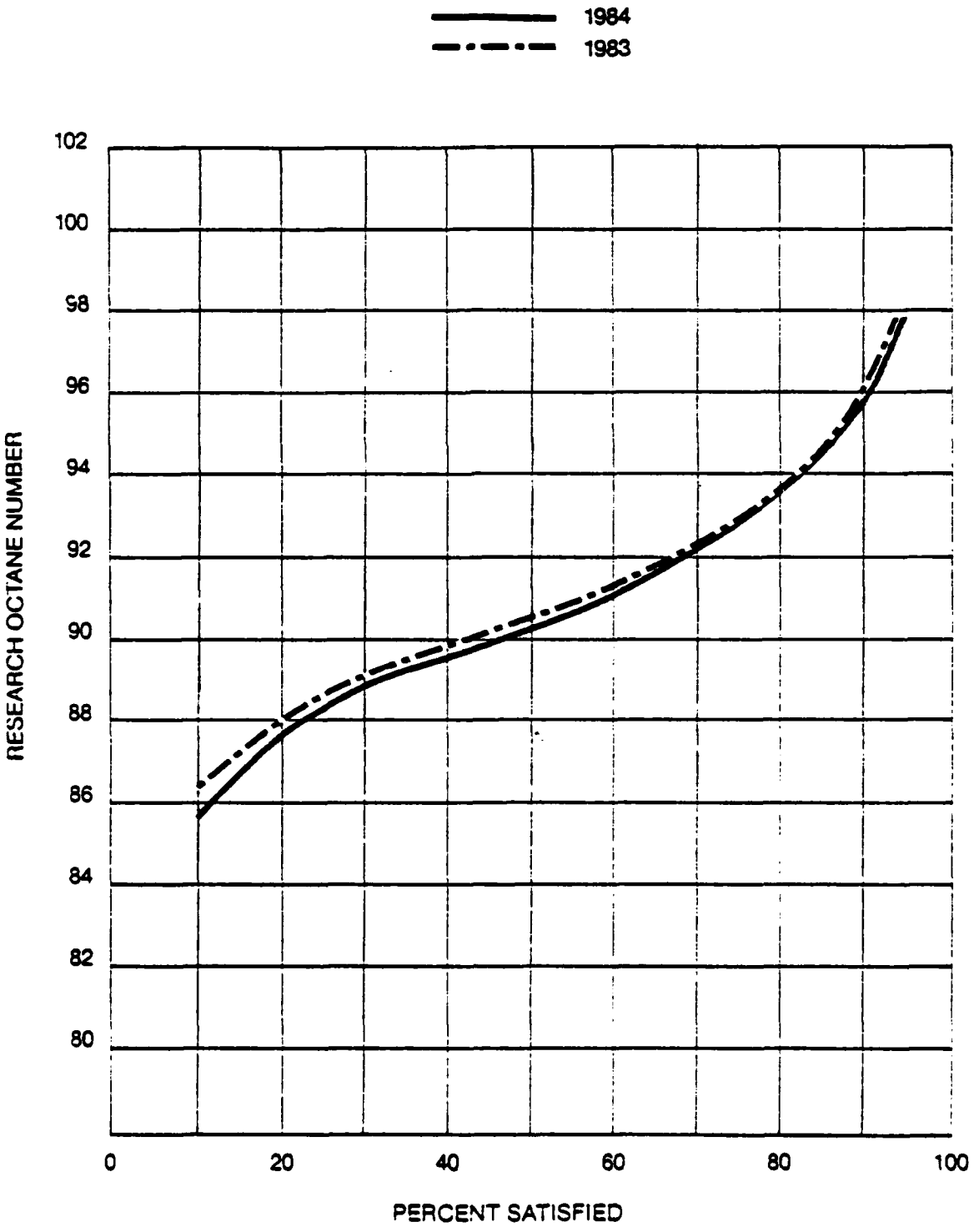


FIGURE 8

COMPARISON OF MAXIMUM FBRSU FUEL REQUIREMENTS 1984 AND 1983 U.S. AND IMPORTED VEHICLES

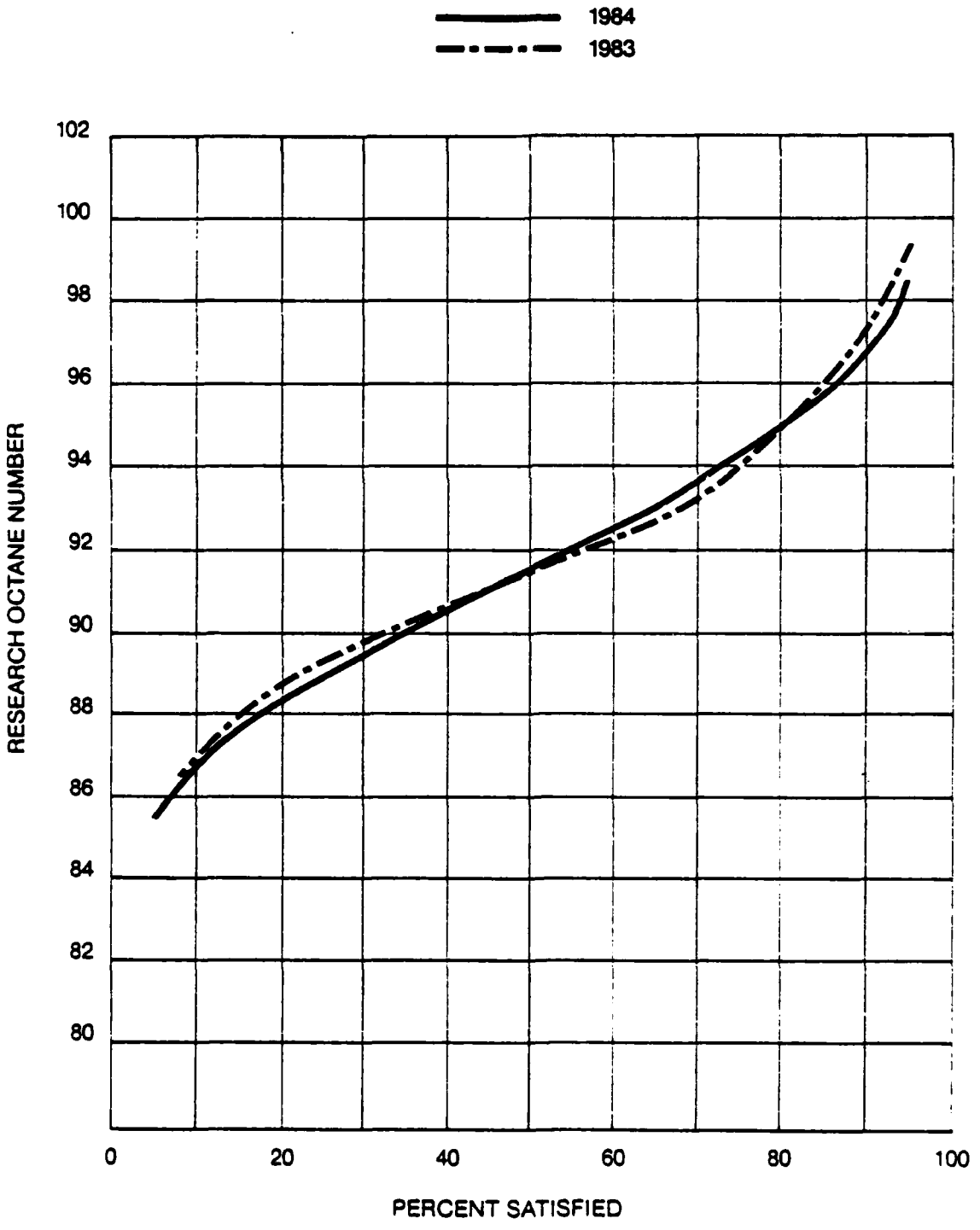
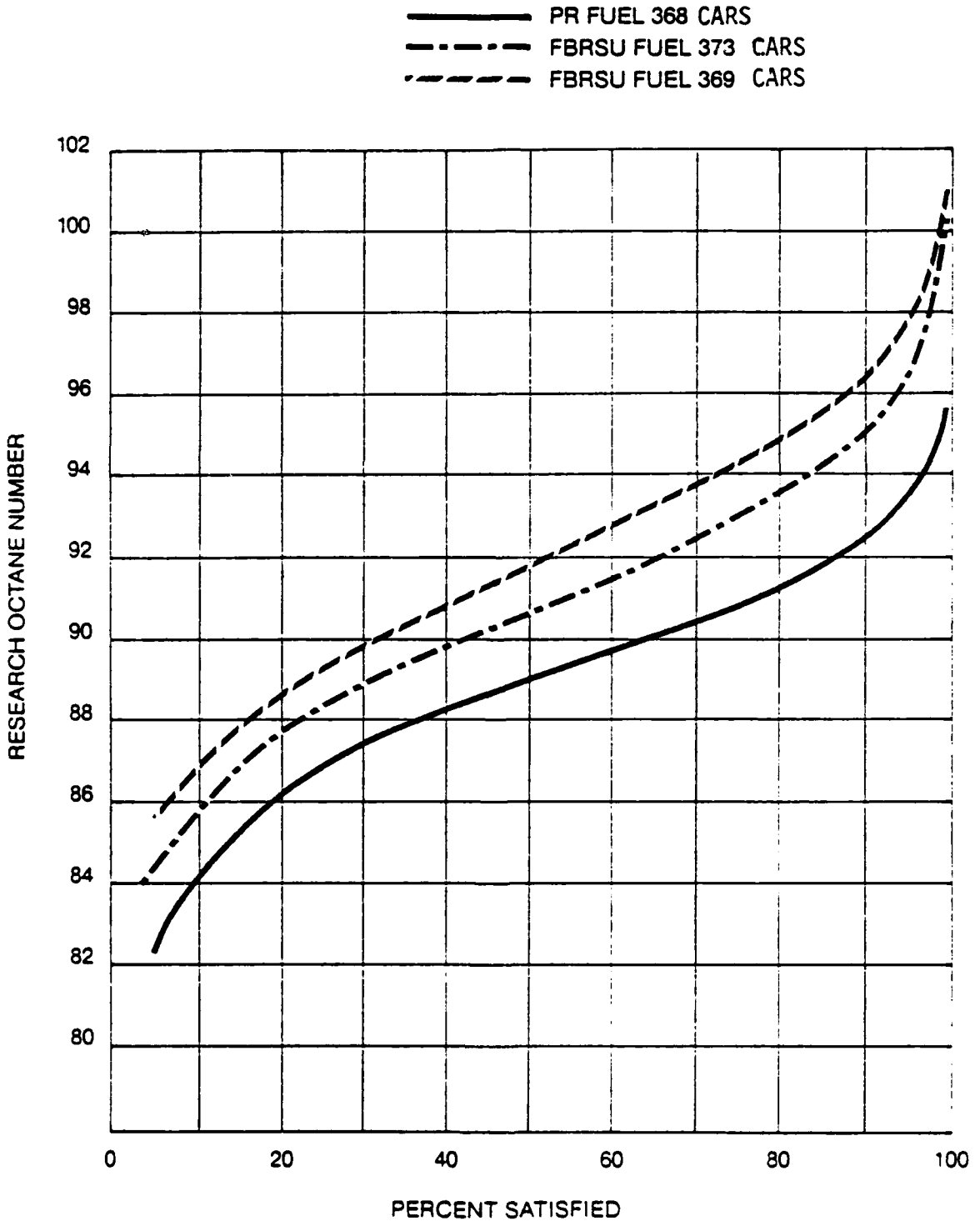


FIGURE 9a

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1984 U.S. AND IMPORTED CARS



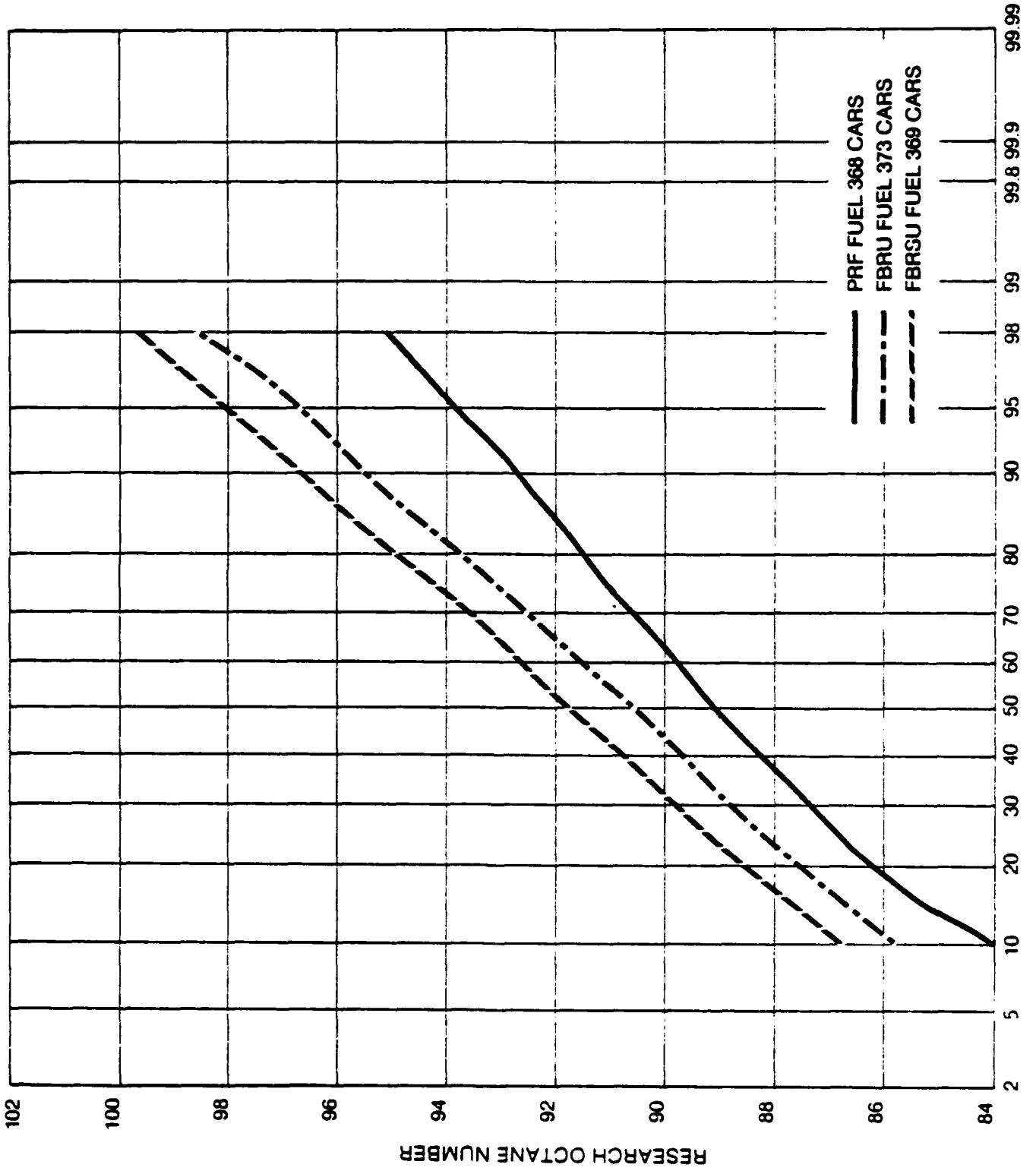
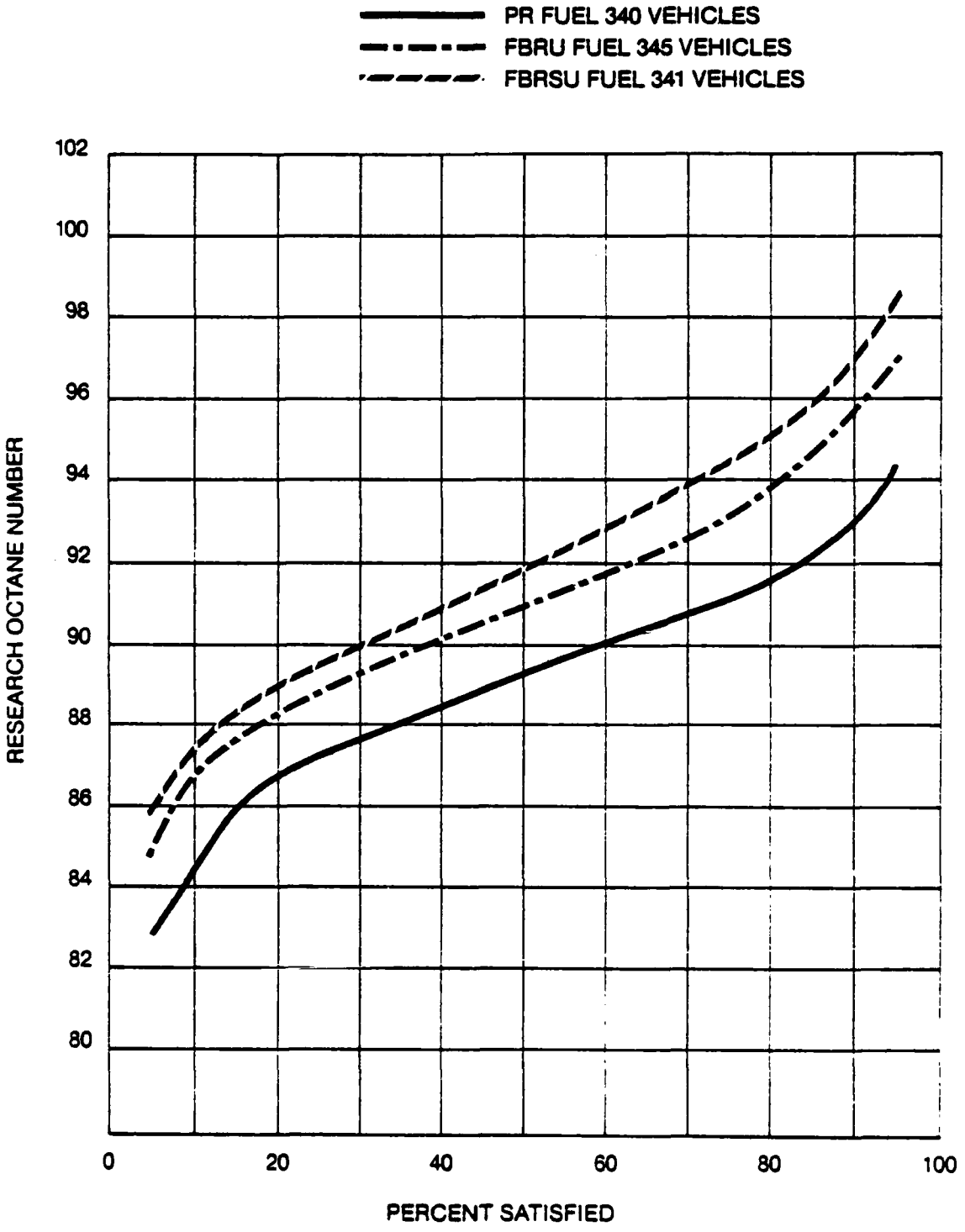

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1984 U.S. AND IMPORTED CARS
RESEARCH OCTANE NUMBER
102
100
98
96
94
92
90
88
86
84
PERCENT SATISFIED
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
PRF FUEL 368 CARS
FBRU FUEL 373 CARS
FBRSU FUEL 369 CARS

FIGURE 10a

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1984 U.S. VEHICLES



DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1984 U.S. VEHICLES

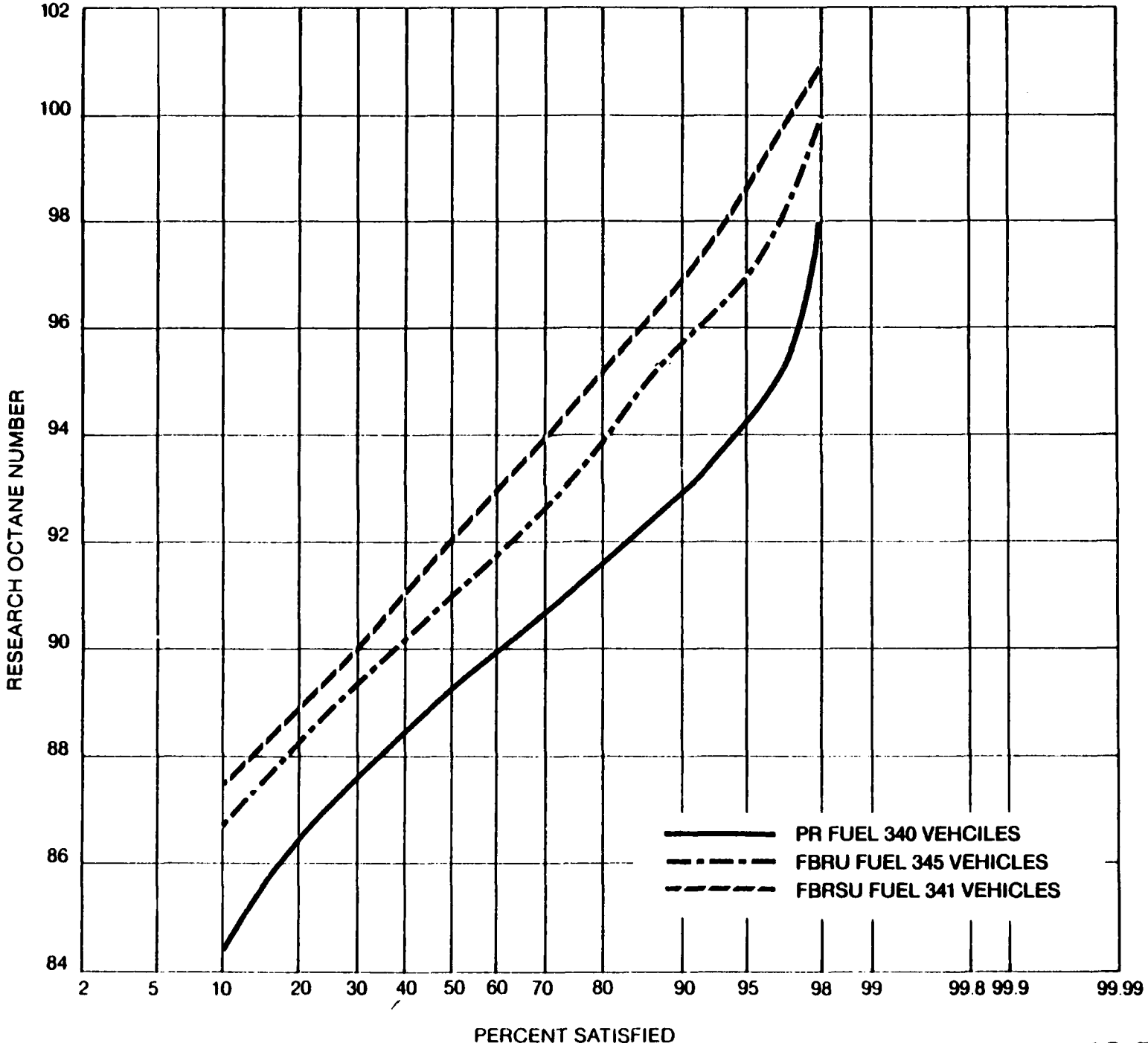


FIGURE 11

COMPARISON OF MAXIMUM PR FUEL REQUIREMENTS
1984 AND 1983 U.S. VEHICLES

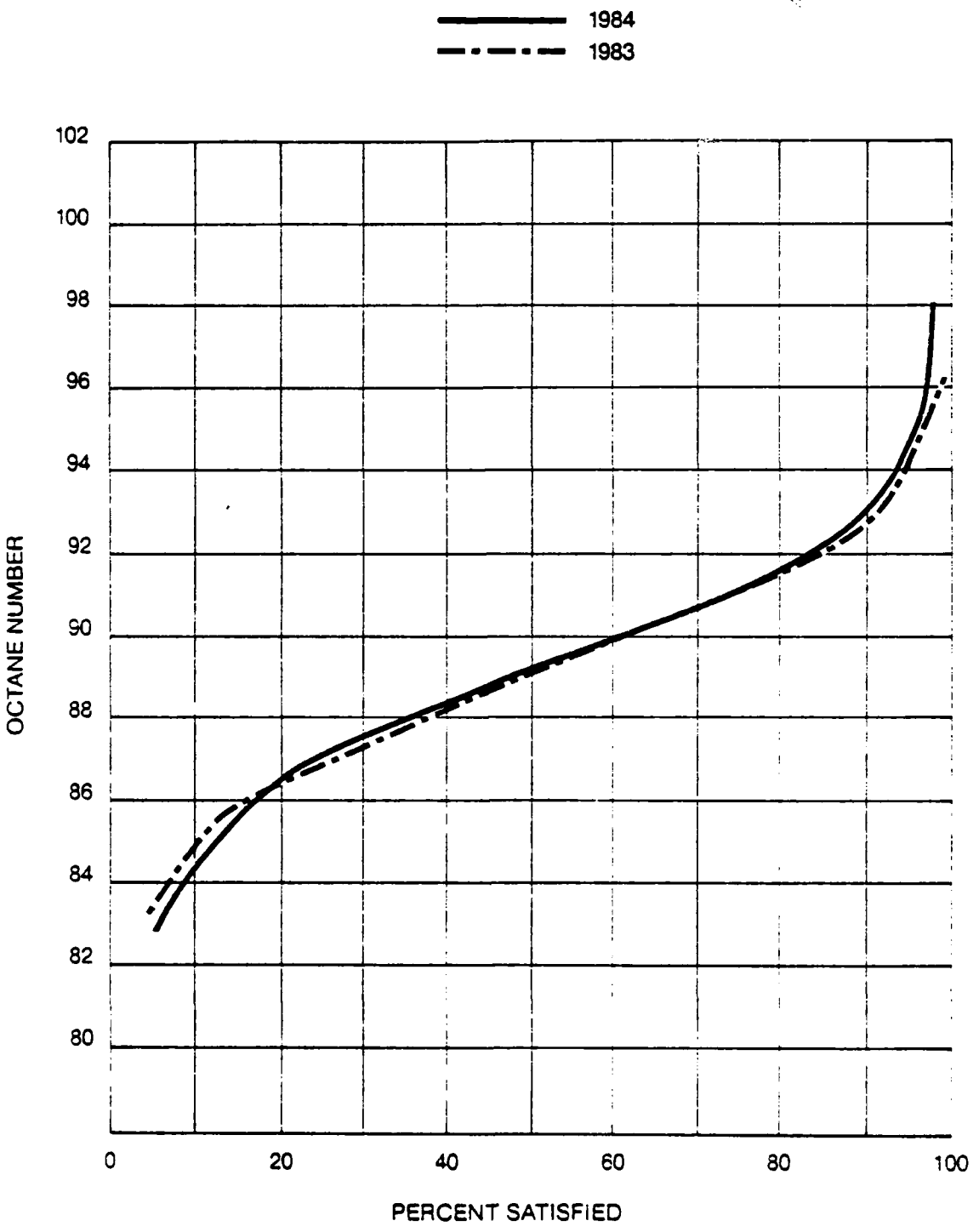


FIGURE 12

COMPARISON OF MAXIMUM FBRU FUEL REQUIREMENTS
1984 AND 1983 U.S. VEHICLES

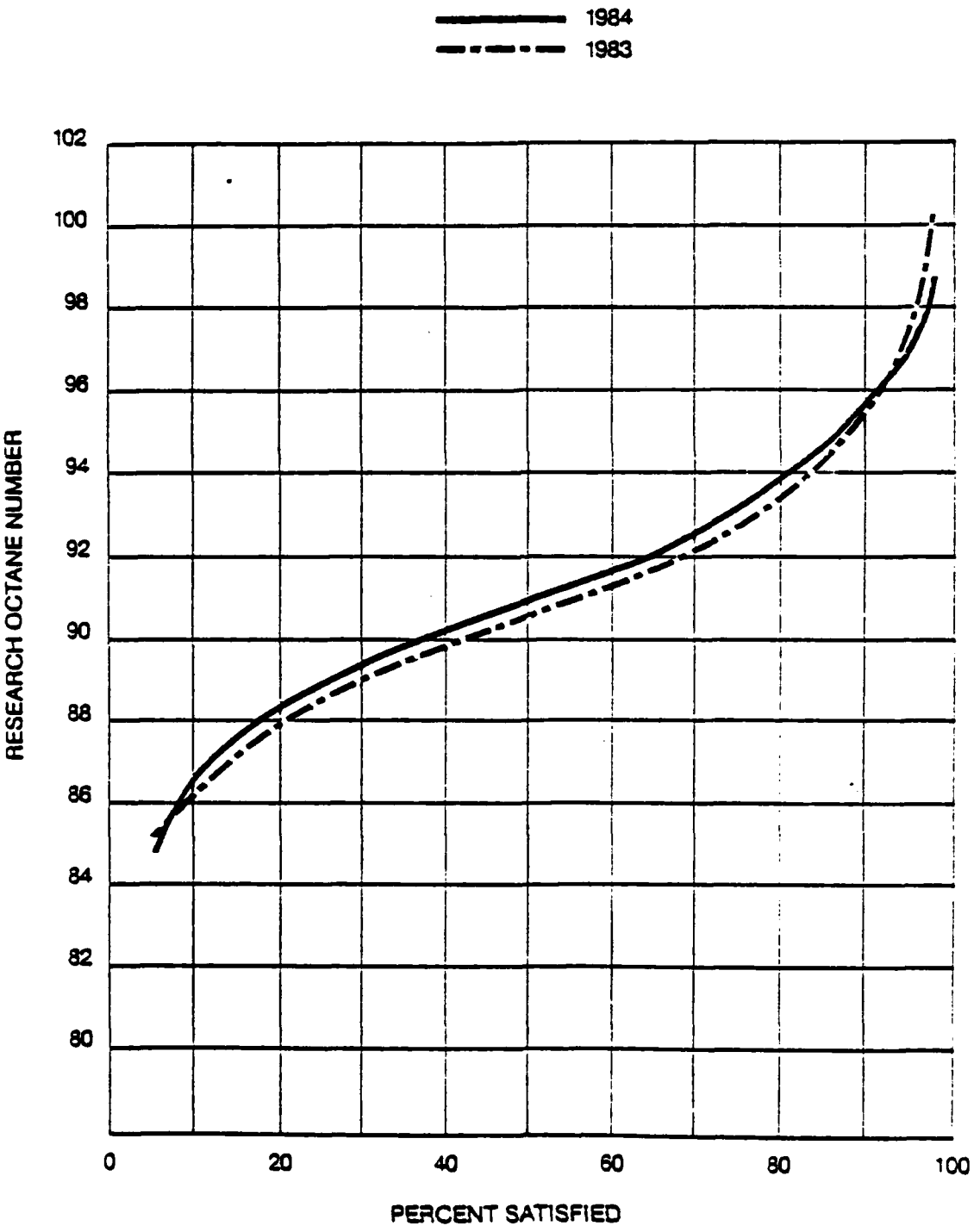


FIGURE 13

COMPARISON OF MAXIMUM FBRSU FUEL REQUIREMENTS
1984 AND 1983 U.S. VEHICLES

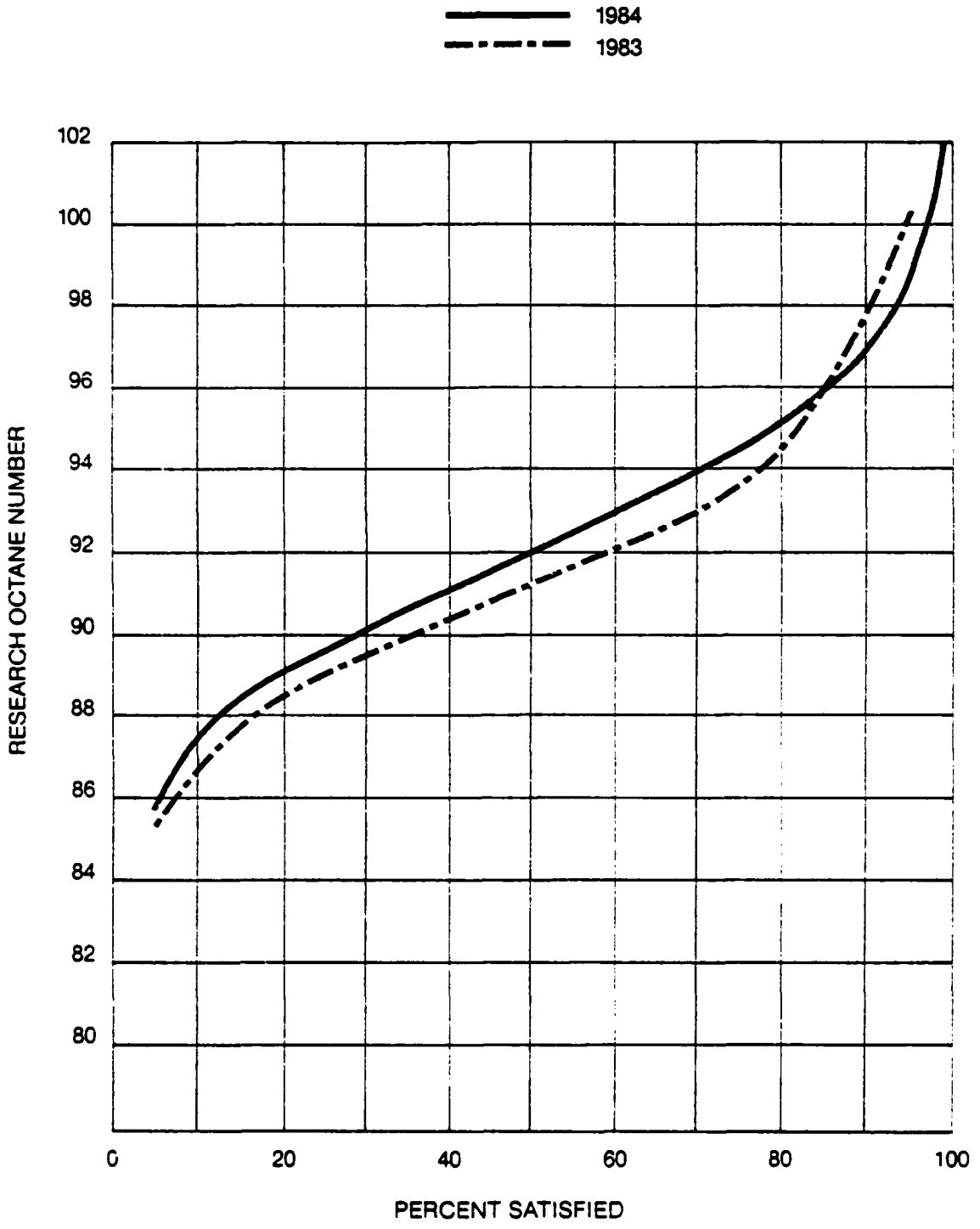


FIGURE 14a

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1984 U.S. CARS

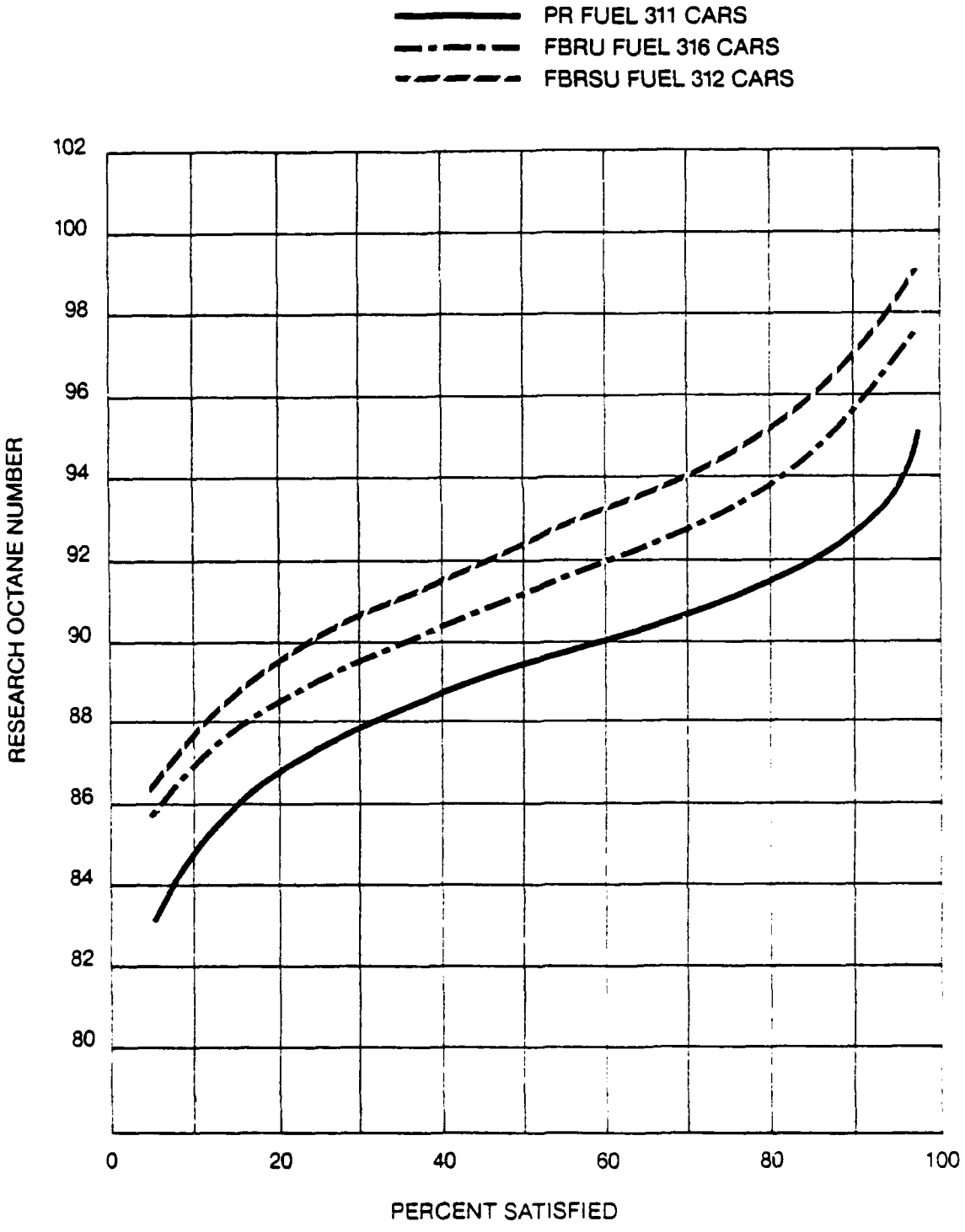


FIGURE 14b

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1984 U.S. CARS

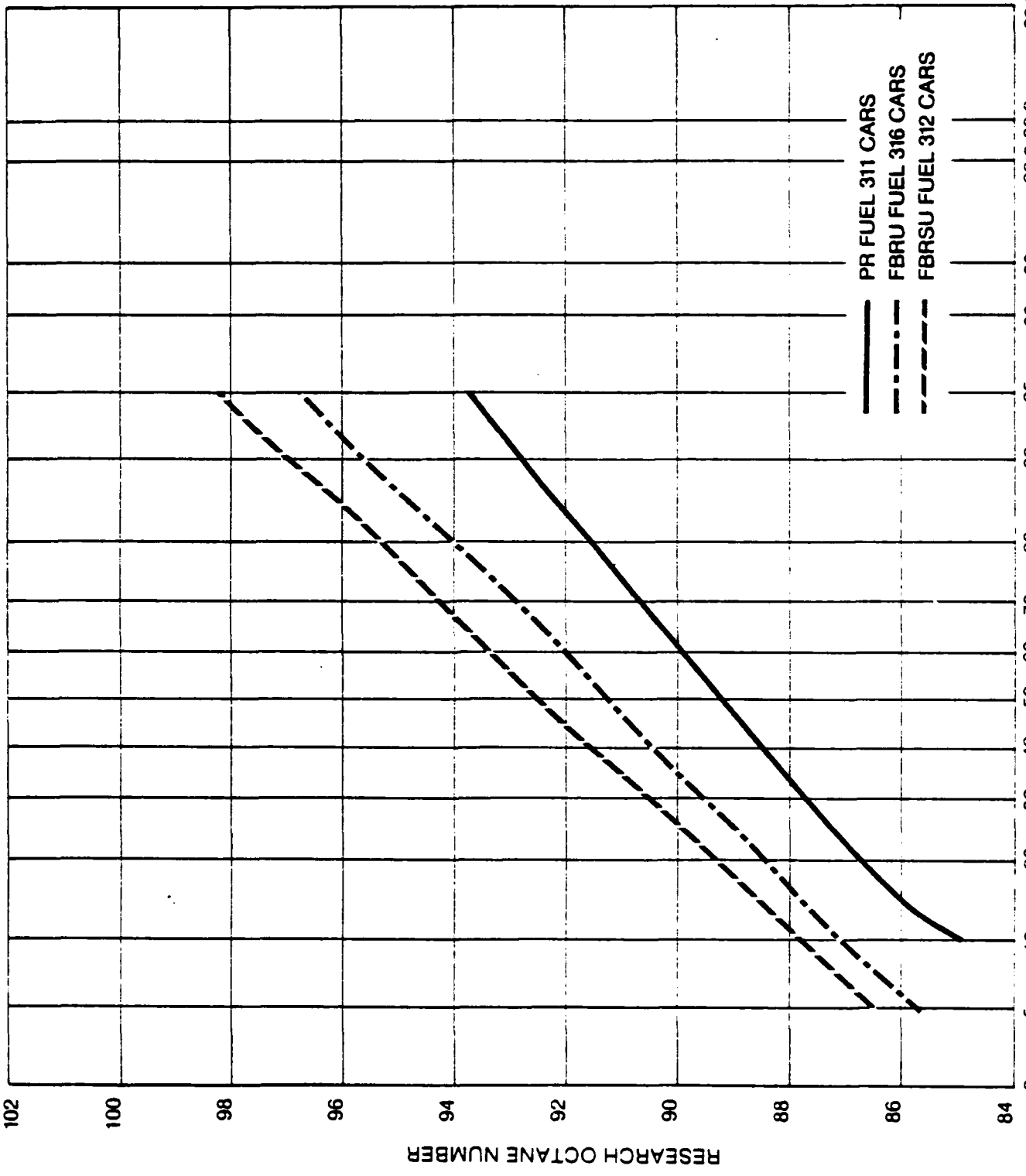


FIGURE 15a

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS 1984 IMPORTED VEHICLES

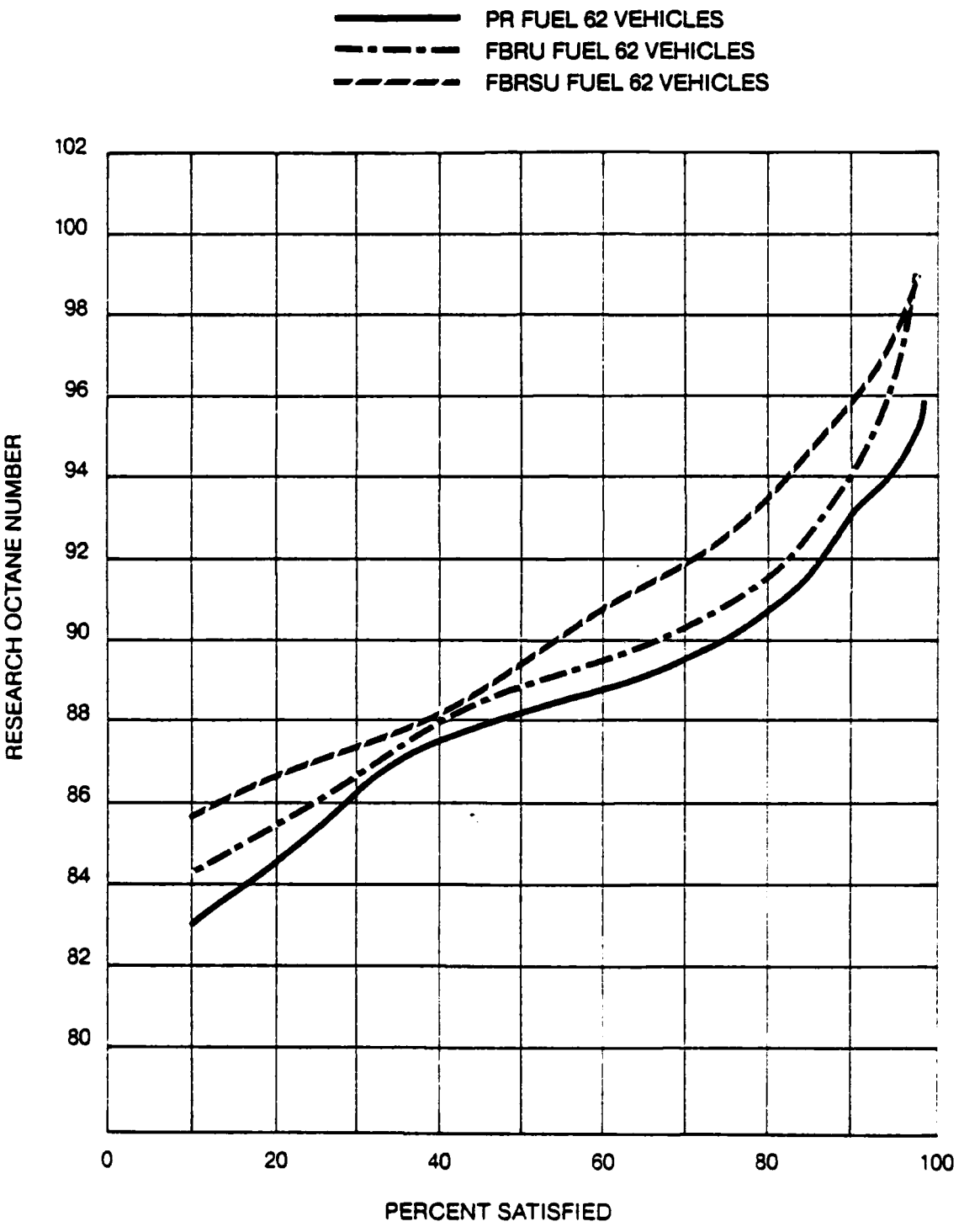


FIGURE 15b

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1984 IMPORTED VEHICLES

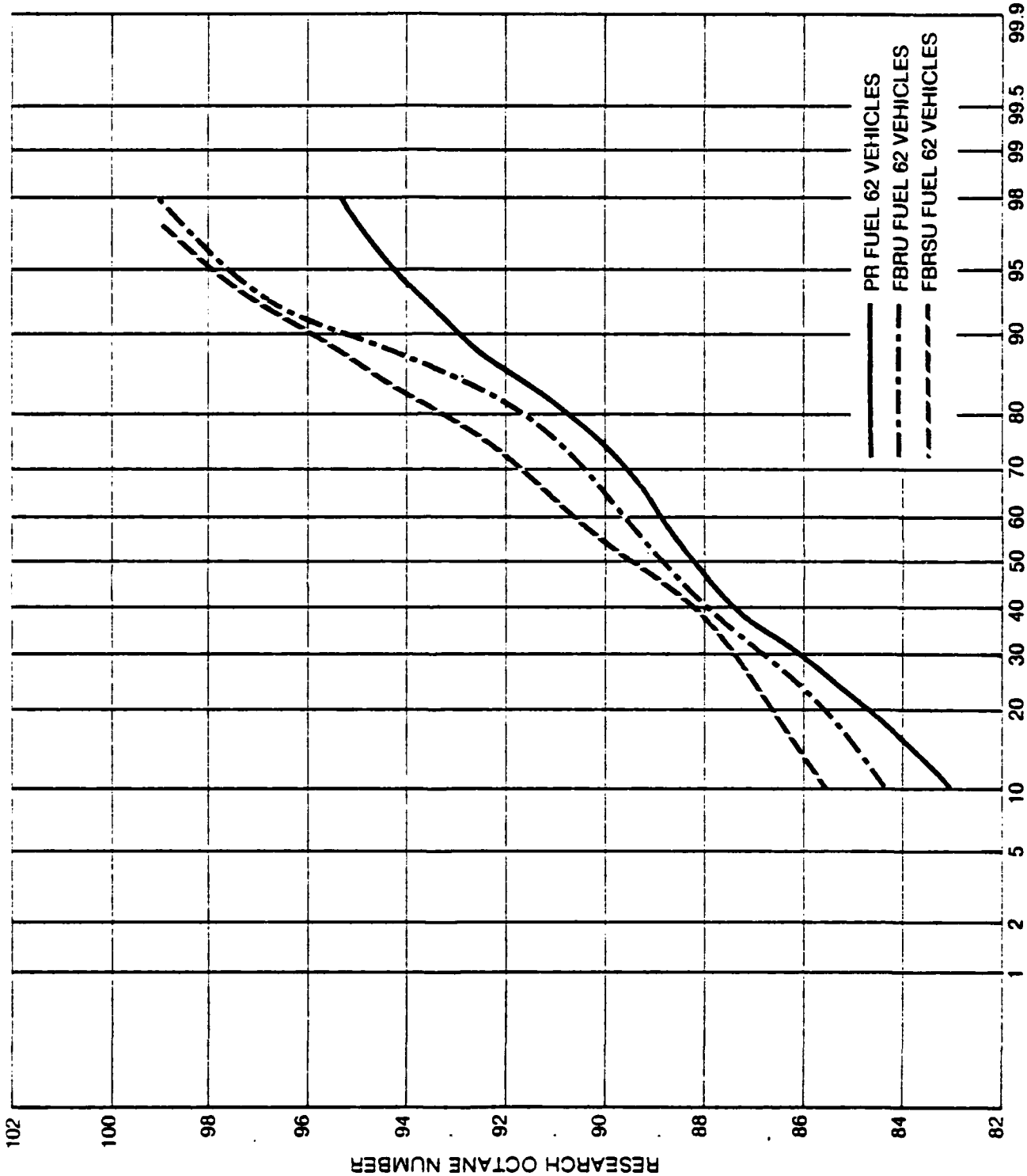


FIGURE 16

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1984 U.S. AND IMPORTED KNOCK-SENSOR VEHICLES ONLY
MAXIMUM (HIGH BORDERLINE)

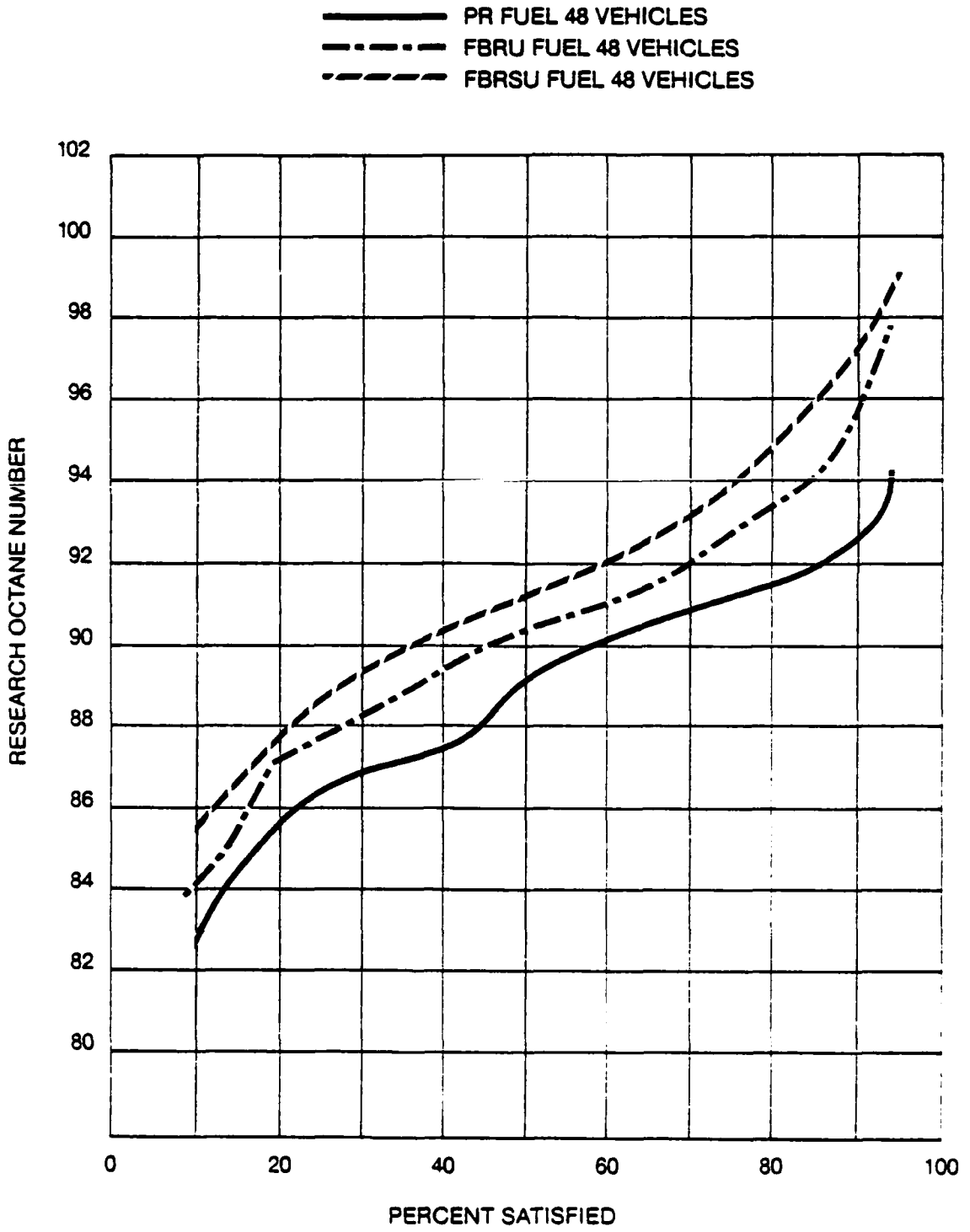


FIGURE 17

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1984 U.S. AND IMPORTED KNOCK-SENSOR VEHICLES ONLY
MINIMUM (LOW BORDERLINE)

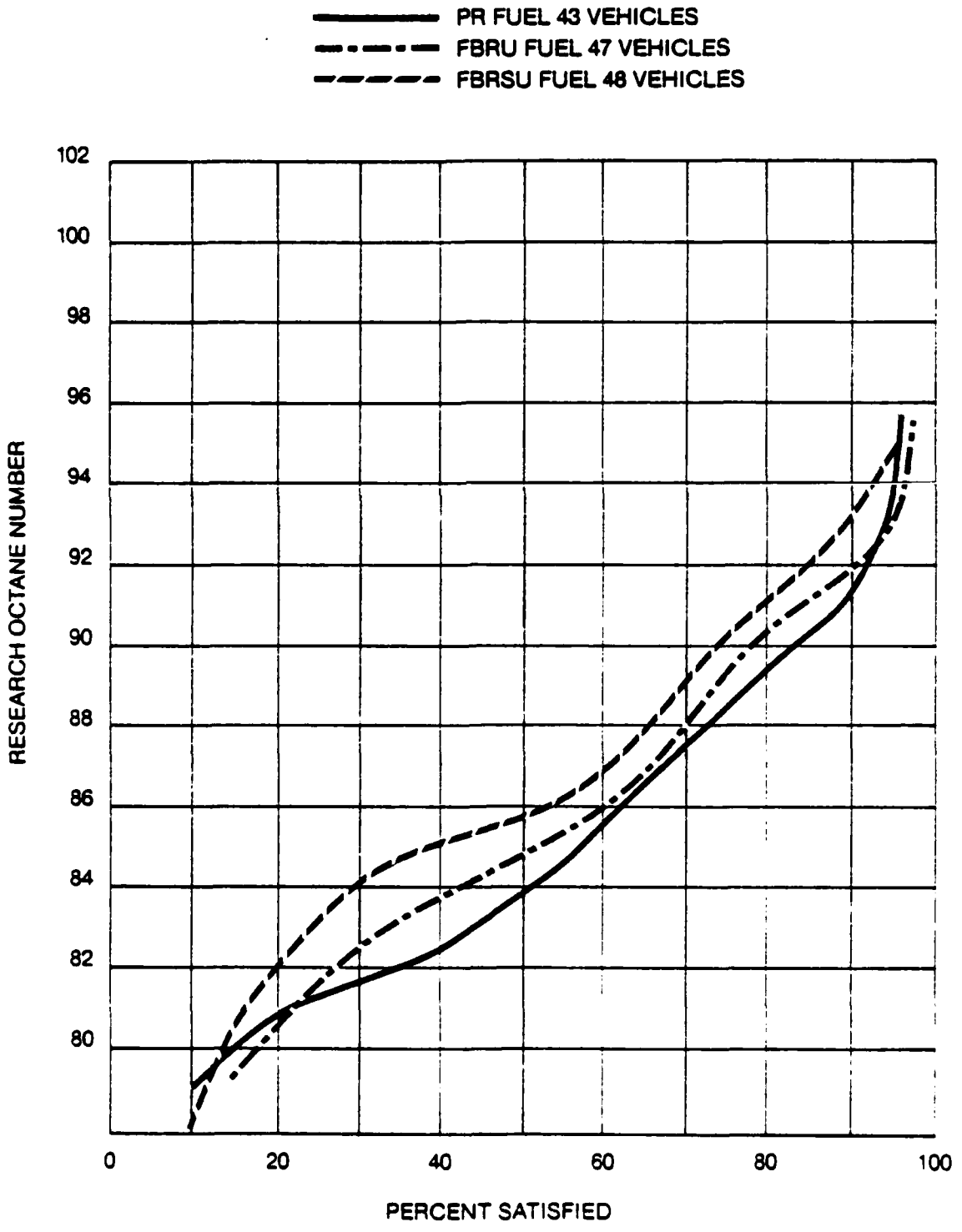


FIGURE 18

DISTRIBUTION OF MAXIMUM FBRU RON REQUIREMENTS 1984 U.S. AND IMPORTED KNOCK-SENSOR VEHICLES ONLY

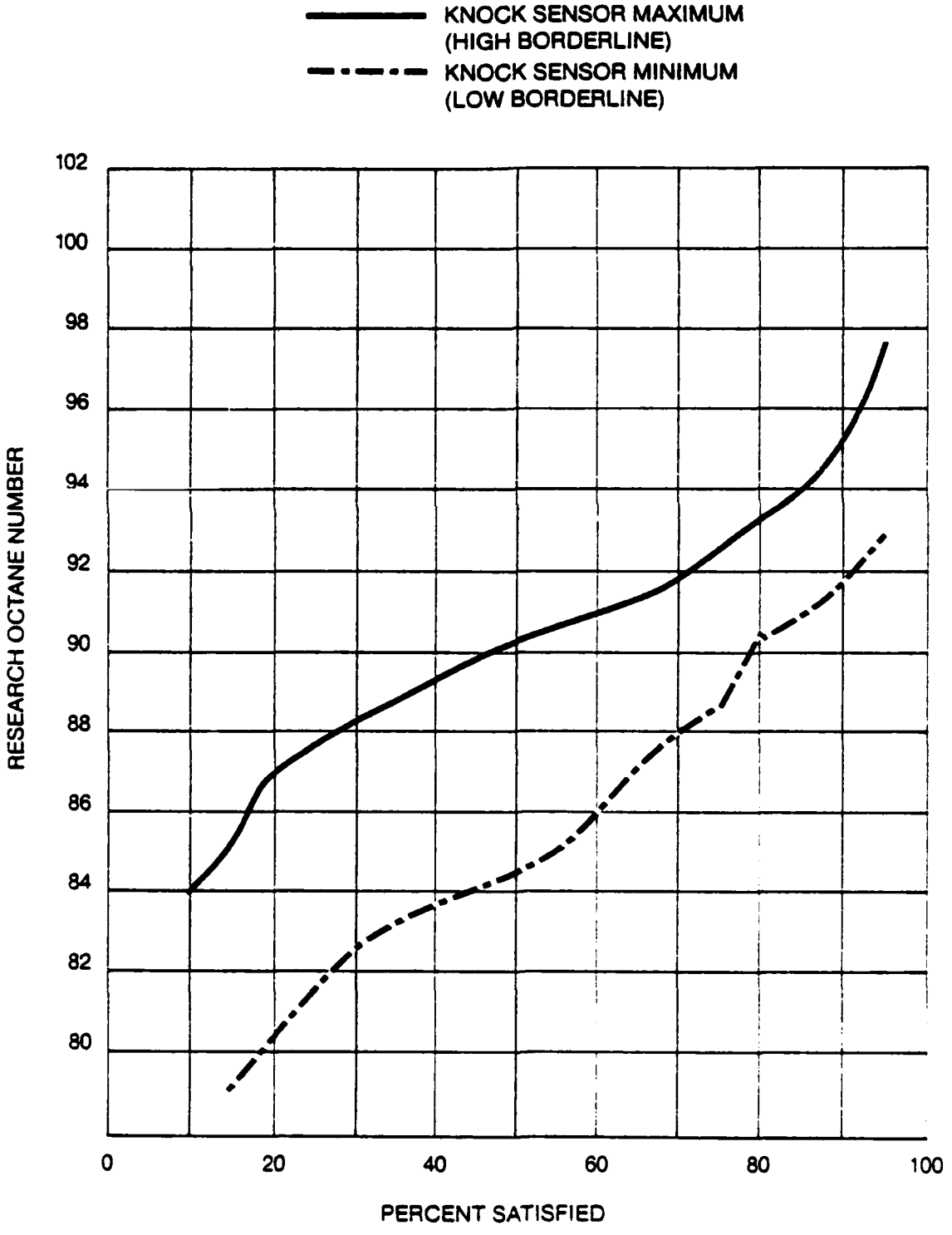


FIGURE 19

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1984 MODELS KED F22A3/DED F22A3 (13 CARS)

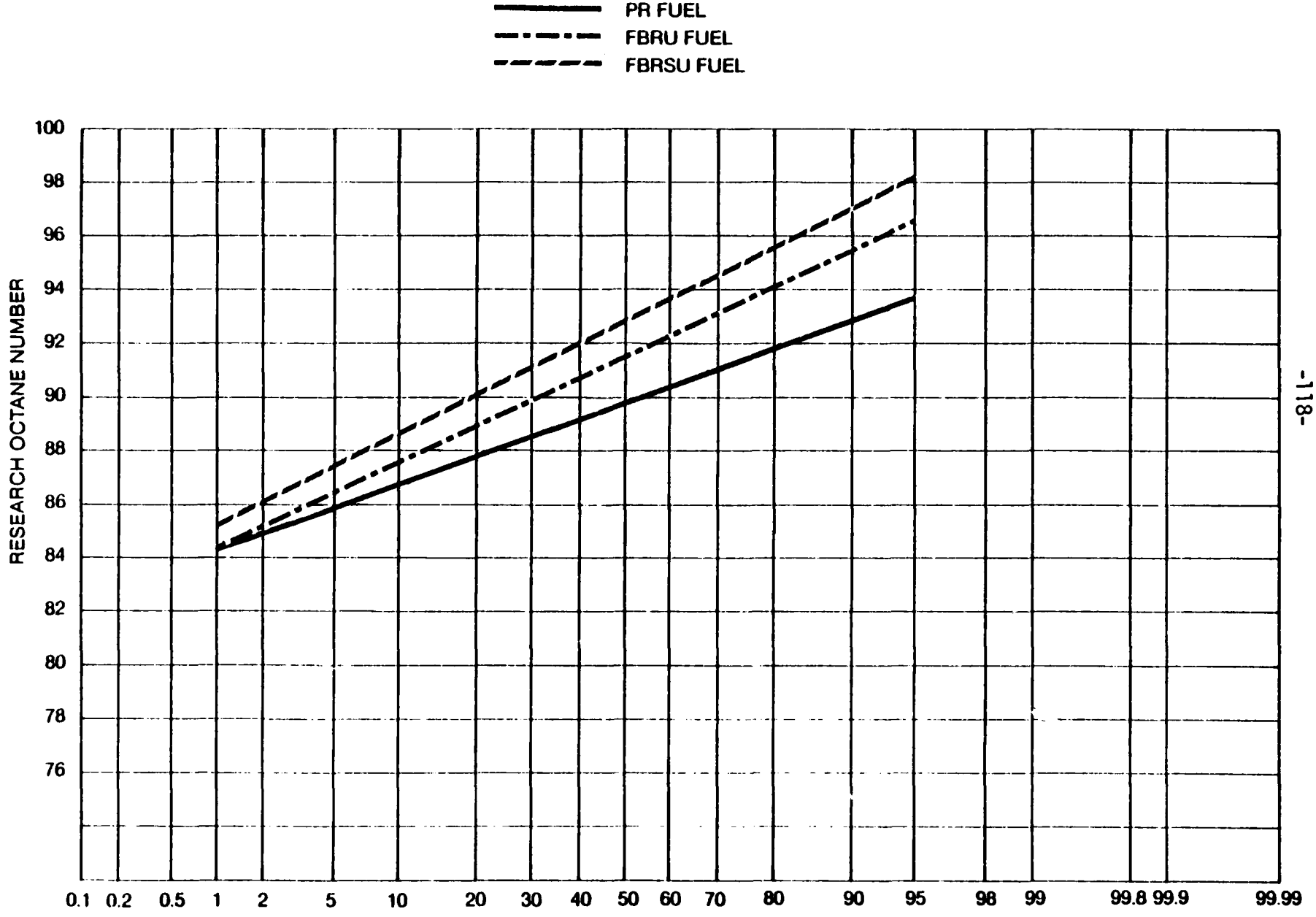


FIGURE 20

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1984 MODELS PKC 222A3/KKC 222A3/DKC 222A3 (14 CARS)

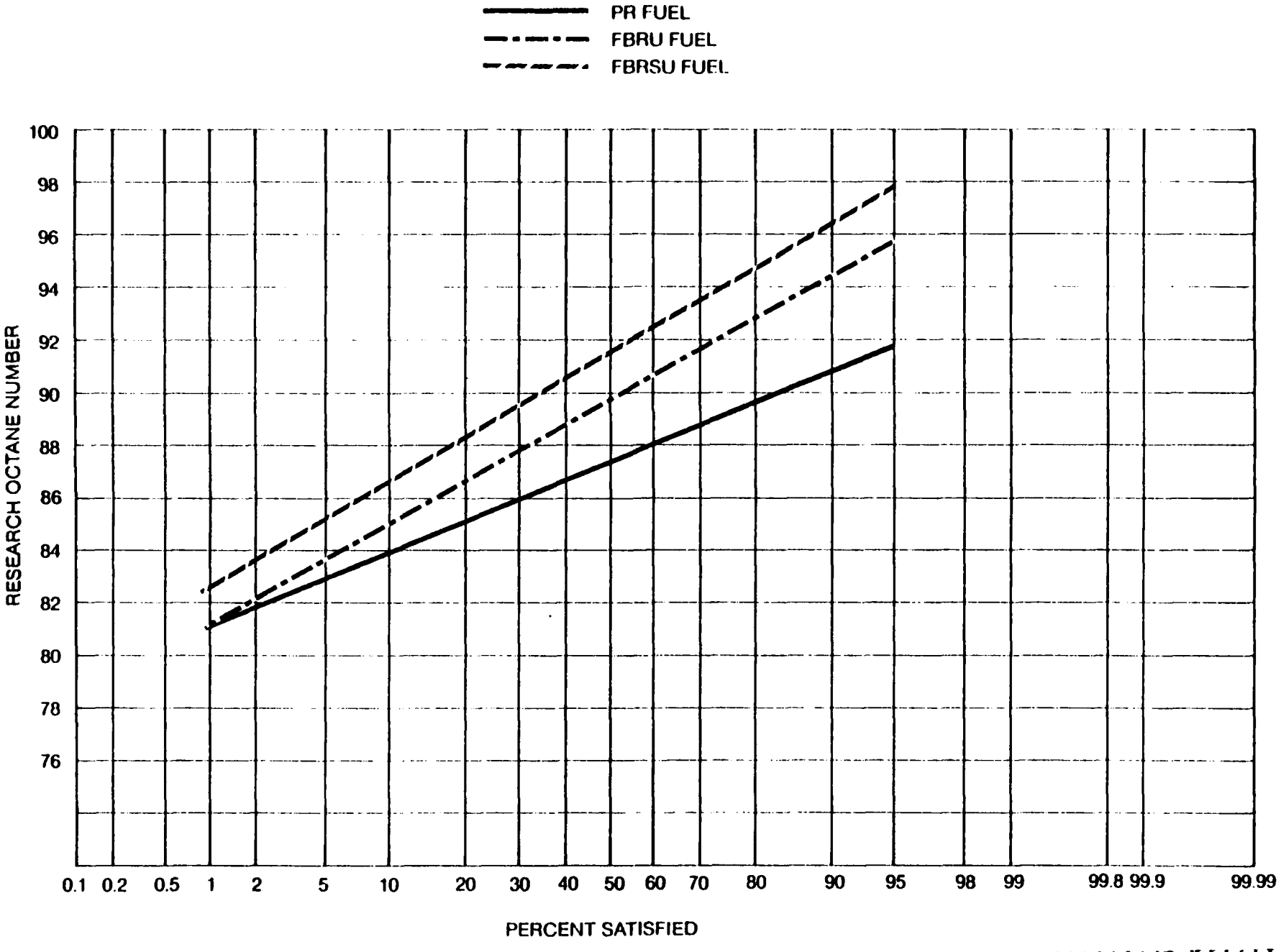


FIGURE 21

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1984 MODELS: OCR 123A3/MCR 123A3 (25 CARS)

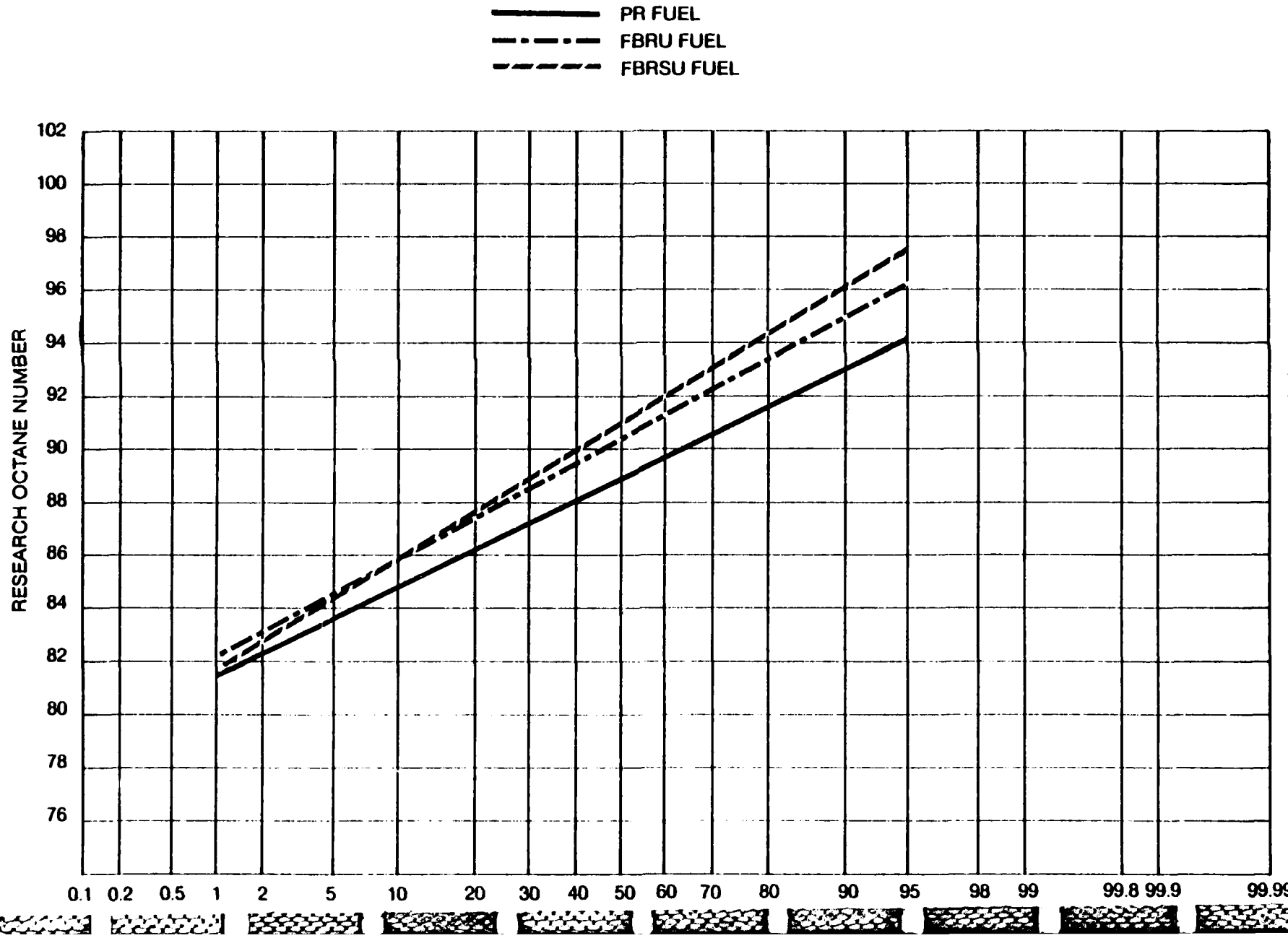


FIGURE 22a

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS — MAXIMUM (HIGH BORDERLINE)
1984 KNOCK-SENSOR MODELS: IAE 230A3/LAE 230A3 (14 CARS)

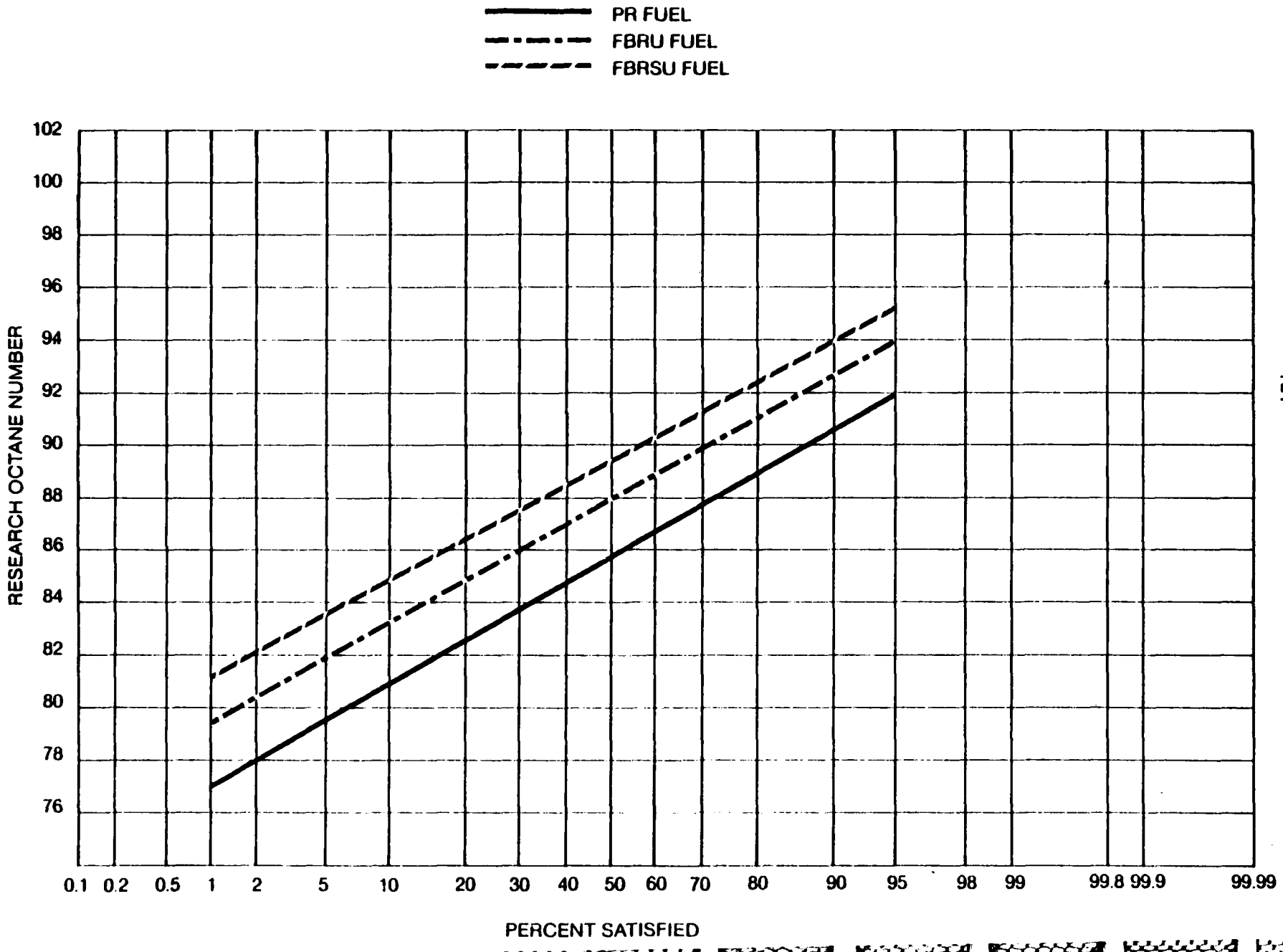


FIGURE 22b

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENT — MINIMUM (LOW BORDERLINE)
1984 KNOCK-SENSOR MODELS: IAE 230A3/LAE 230A3 (14 CARS)

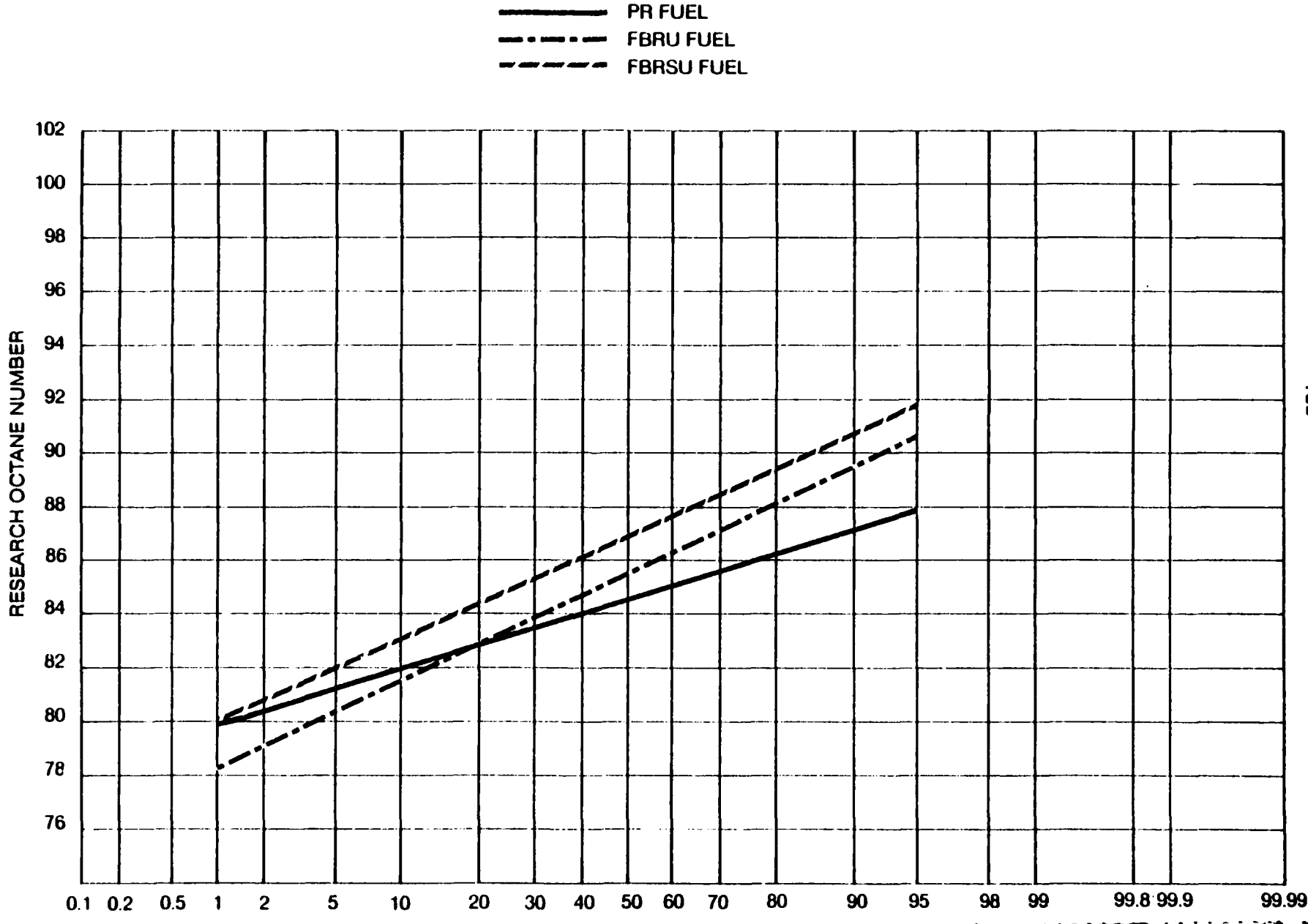


FIGURE 23

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1984 MODELS: NAR F25A3/HAR F25A3/IAR F25A3/LAR F25A3 (12 CARS)

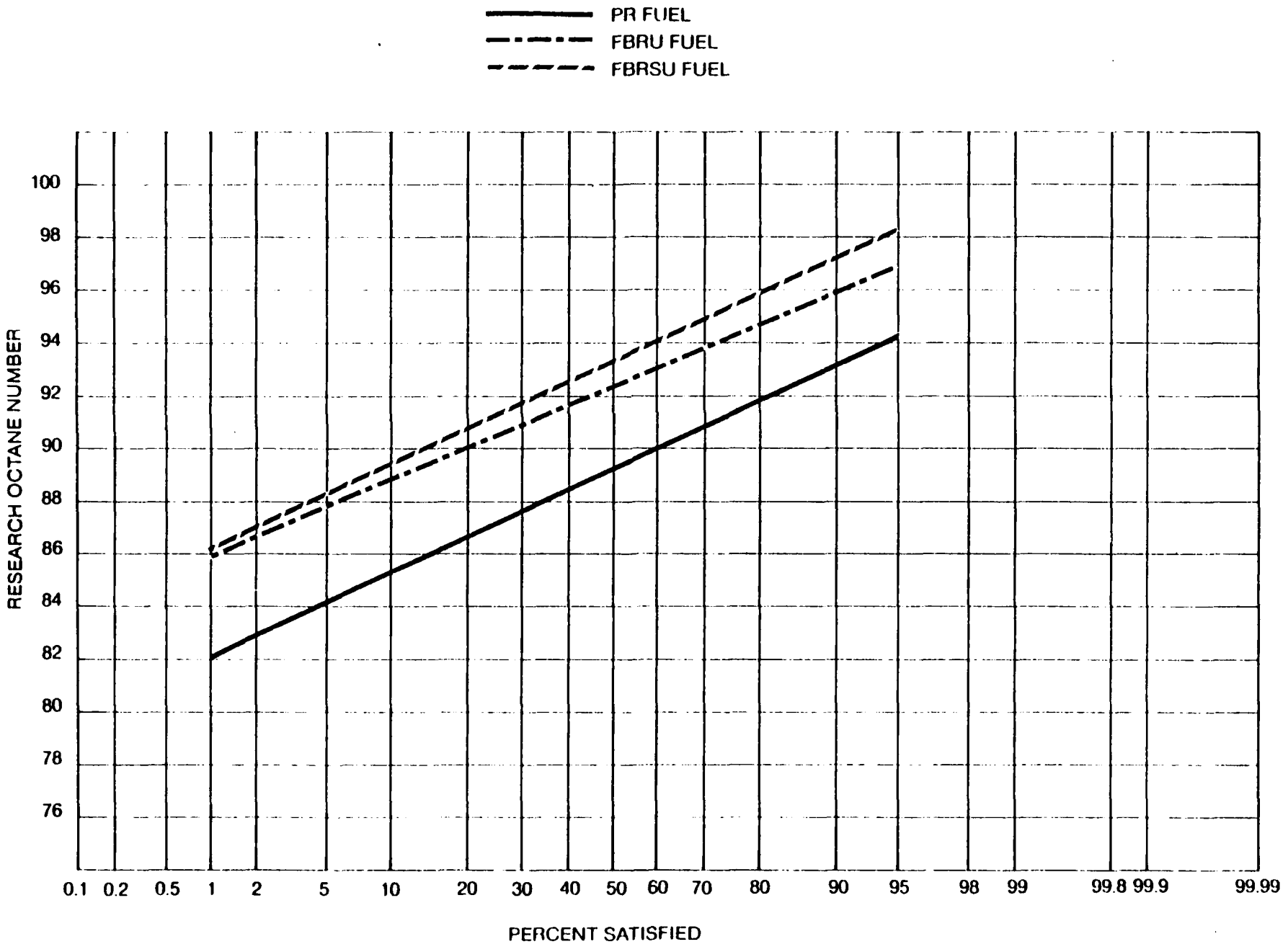


FIGURE 24

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1984 MODELS: NAX 228 A3/HAX 228A3 (13 CARS)

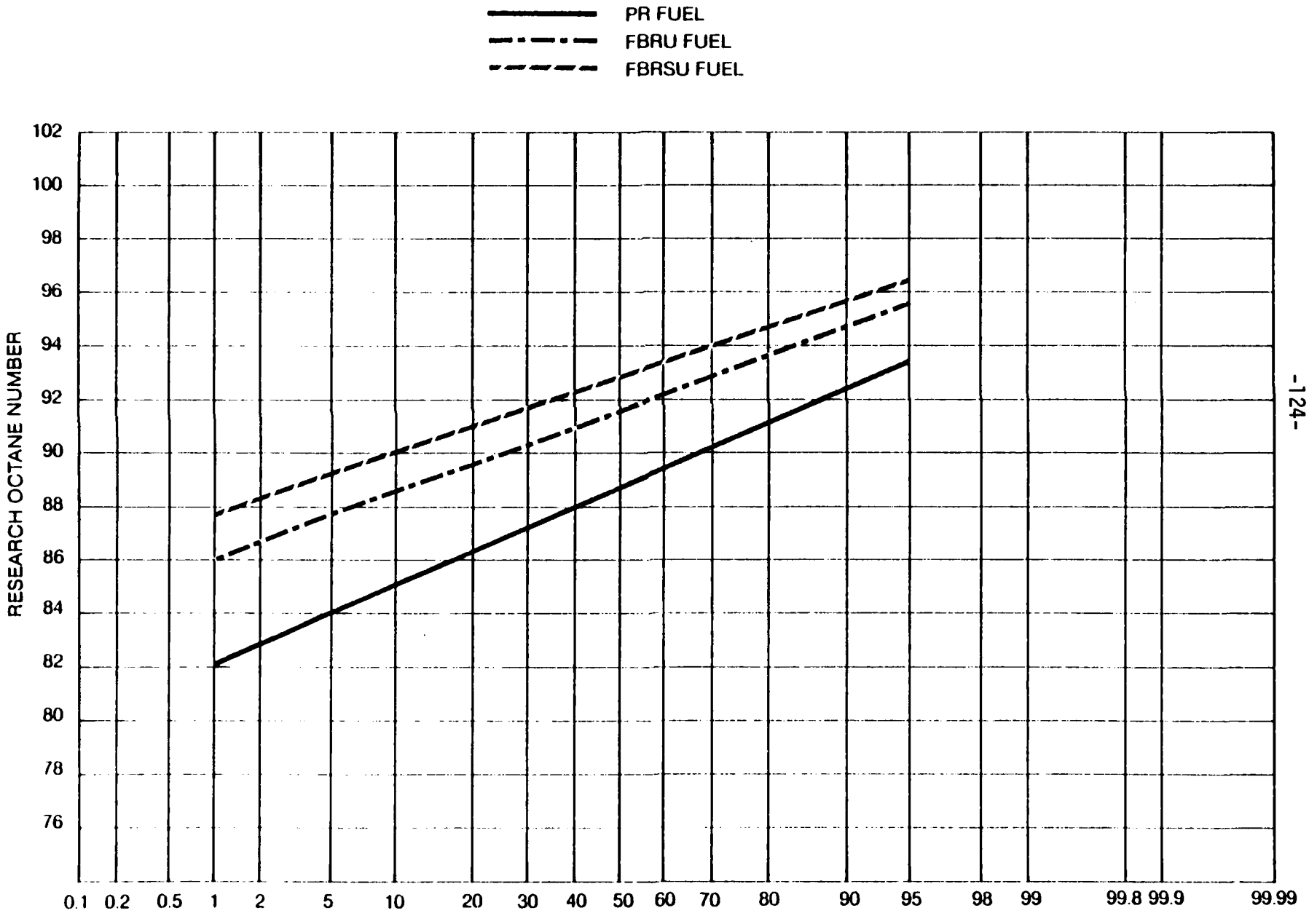


FIGURE 25

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1984 MODELS: NBH 450A4/HBH 450 A4 (12 CARS)

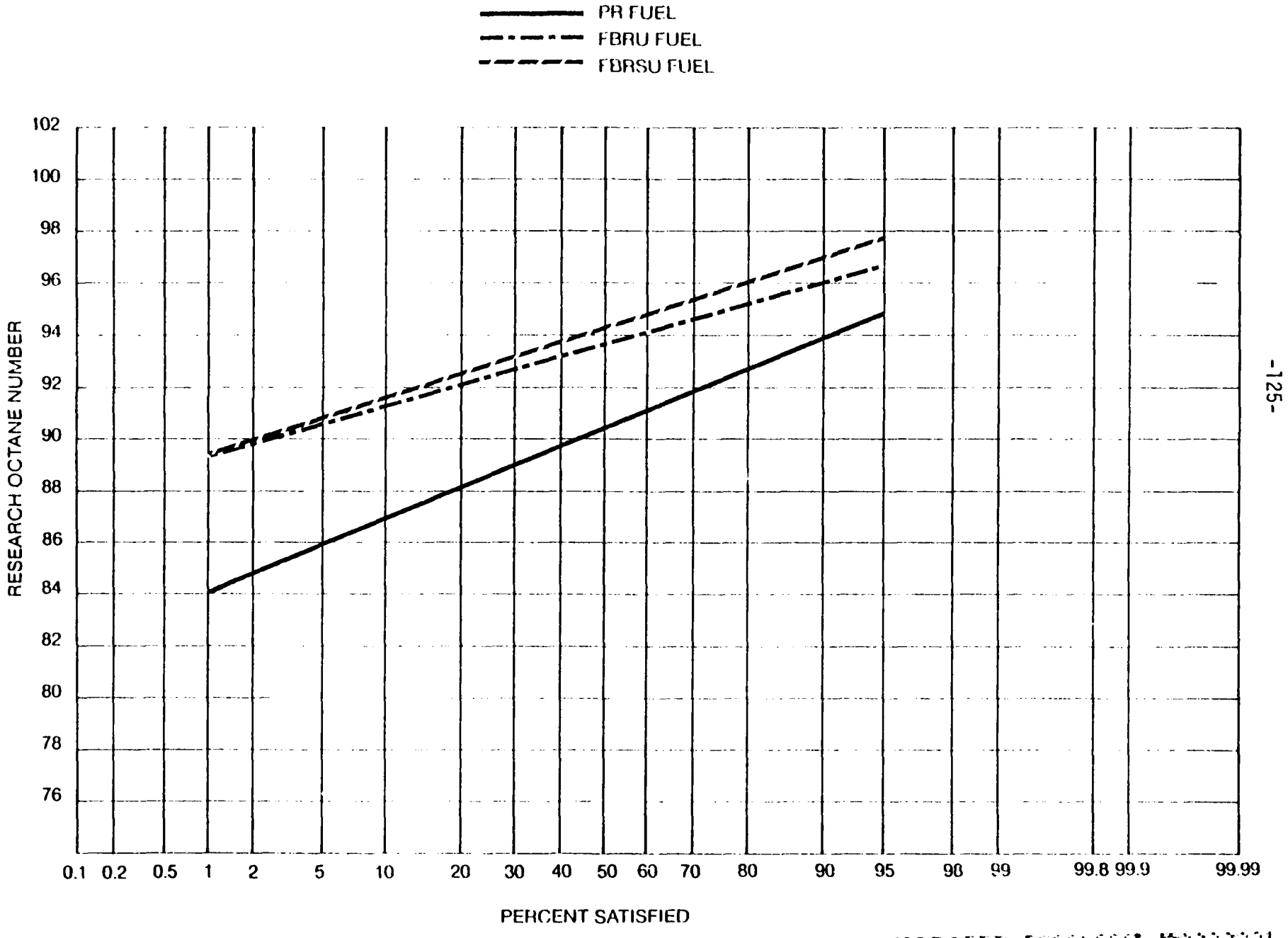


FIGURE 26

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1984 MODELS: NJP F20A3/IJP F20A3/LJP F20A3 (16 CARS)

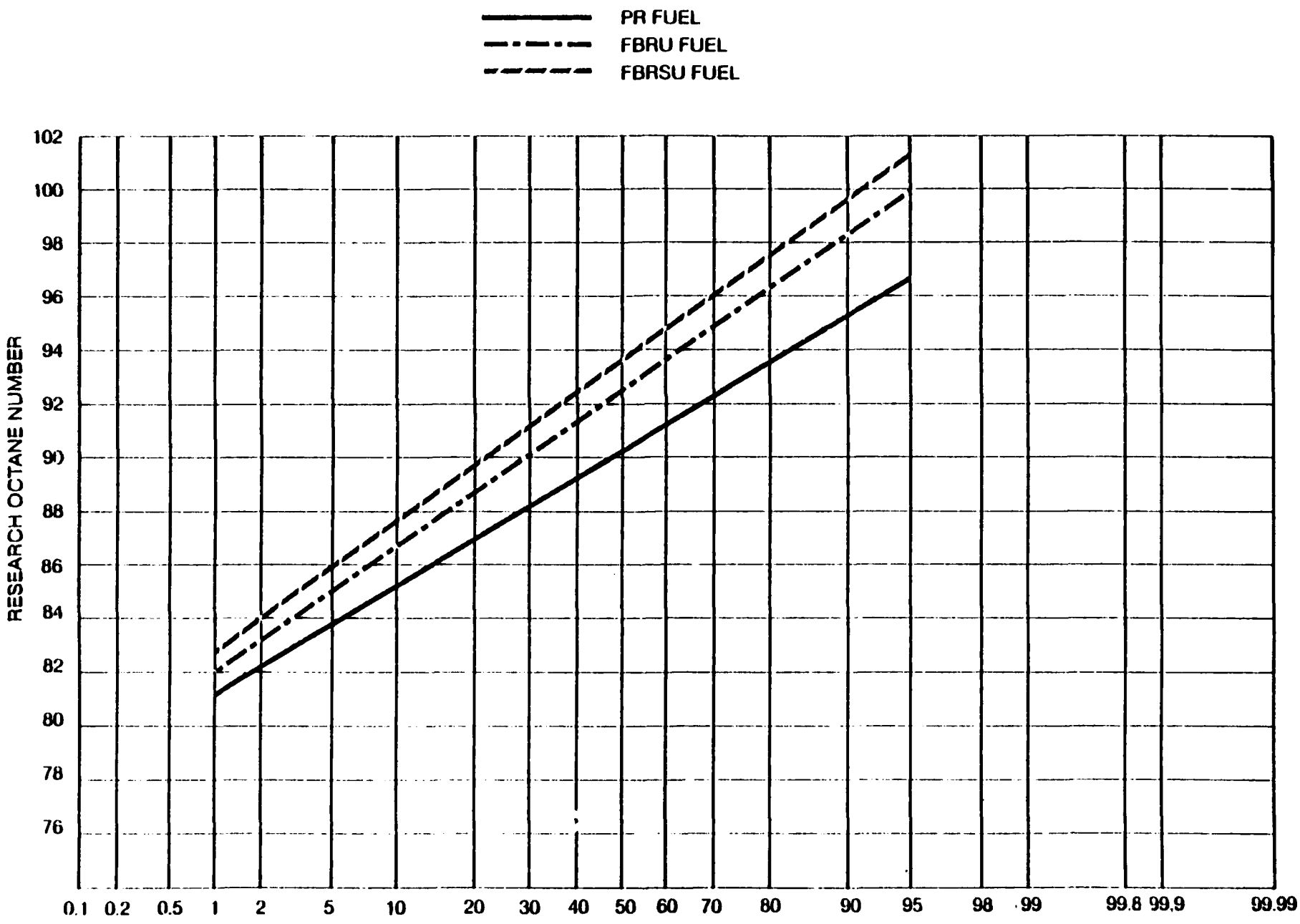
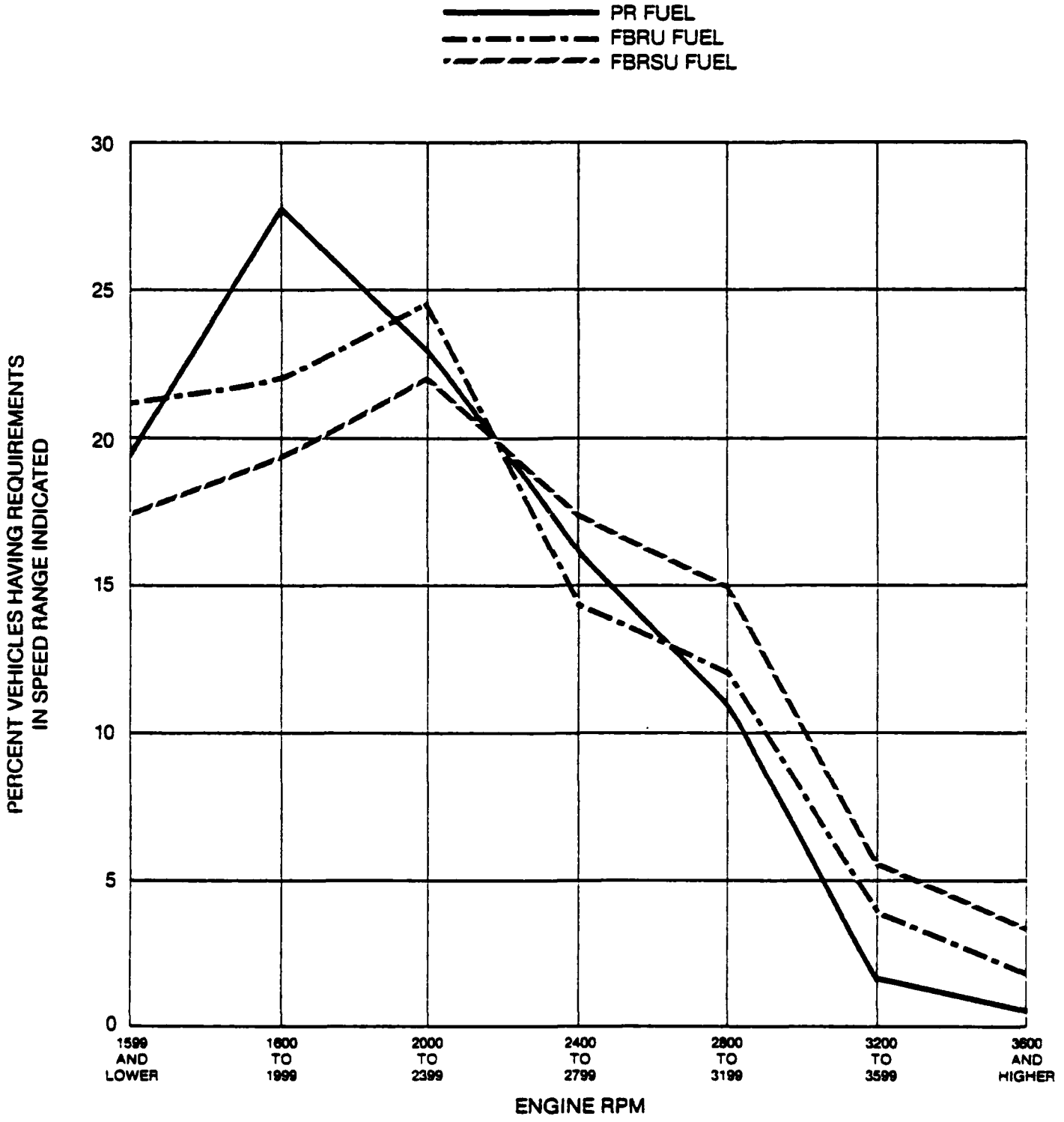


FIGURE 27

ENGINE SPEEDS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS
ALL 1984 VEHICLES



APPENDIX A

PARTICIPATING LABORATORIES

PARTICIPATING LABORATORIES

No. of Cars Tested*	Eastern Area	East Central Area	No. of Cars Tested*
67	Exxon Res. & Engrg. Co. Linden, New Jersey	Chrysler Corporation Highland Park, Michigan	6
15	Gulf Res. & Dev. Co. Pittsburgh, Pennsylvania	Ford Motor Company Dearborn, Michigan	27
28	Mobil Res. & Dev. Corp. Paulsboro, New Jersey	General Motors Corp. Warren, Michigan	28
31	Sun Company Marcus Hook, Pennsylvania	Nissan Res. & Dev. Ann Arbor, Michigan	10
28	Texaco Inc. Beacon, New York	Shell Canada Oakville, Ontario	10
		Standard Oil Co. (Ohio) Cleveland, Ohio	29
		Toyota Motor Corporation Ann Arbor, Michigan	10
	Western Area	**West Central Area**	
28	Chevron Research Company Richmond, California	Amoco Oil Company Naperville, Illinois	27
29	Union Oil Co. of Calif. Brea, California	ARCO Petroleum Products Harvey, Illinois	5
		Phillips Petroleum Co. Bartlesville, Oklahoma	18
		Shell Development Co. Houston, Texas	30

* Review of data sheets submitted indicated that some data were not suitable for inclusion in the data analysis.

APPENDIX B

MEMBERSHIP: 1984 ANALYSIS PANEL

1984 CRC OCTANE NUMBER REQUIREMENT SURVEY

1984 ANALYSIS PANEL

J. C. Ingamells, Leader	Chevron Research Company
D. P. Barnard	Standard Oil Company (Ohio)
J. L. Borzone	Mobil Research and Development Corp.
R. A. Bouffard	Exxon Research and Engineering Company
J. C. Callison	Amoco Oil Company
E. S. Corner	Consultant
R. E. Dizak	Gulf Research and Development Company
F. A. Hume	Mobil Oil Corporation
R. A. Wirth	Sun Company
T. Wusz	Union Oil Company of California

A P P E N D I X C

DATA ON 1984
FULL-BOILING RANGE REFERENCE FUELS

TABLE C-I

SUPPLIERS' FUEL INSPECTIONS

COMPARISON OF 1984 AND 1983 FBRU FUELS

	Low-Octane Base Blend		Intermediate-Octane Base Blend		High-Octane Base Blend	
	RMFD 350-84	RMFD 344-83	RMFD 351-84	RMFD 345-83	RMFD 352-84	RMFD 346-83
Laboratory Inspection						
Distillation, °F						
IBP	91	93	99	95	99	95
10% Evap.	131	123	135	123	126	125
30% Evap.	167	159	184	162	188	181
50% Evap.	208	195	229	210	244	235
70% Evap.	251	233	274	257	265	261
90% Evap.	345	297	335	317	295	294
End Point	416	390	404	414	361	385
Gravity, °API	66.1	66.3	60.5	59.1	51.4	51.1
RVP, psi	7.8	8.5	7.2	8.6	8.0	8.5
Lead, g/gal.	<0.03	<0.003	<0.03	<0.003	<0.03	<0.003
Oxidation Stabilitiy, hr.	>24	>24	>24	>24	>24	>24
Hydrocarbon Type, Vol. %						
Aromatics	23	20	32	37	55	57
Olefins	9	2	5	3	1	1
Saturates	68	78	63	60	44	42
Research Octane Number	77.6	77.4	90.0	90.6	104.0	102.8
Motor Octane Number	73.7	73.7	80.8	82.9	93.3	91.8
Sensitivity	3.9	3.7	7.2	7.7	10.7	11.0

TABLE C-II

OCTANE NUMBERS AND COMPOSITIONS FOR 1984 FBRU FUELS

	Blending Data Composition, Volume Percent				
RON	RMFD 350-84	RMFD 351-84	RMFD 352-84	MON	SEN
78	98	2	--	73.8	4.2
80	81	19	--	75.3	4.7
82	66	34	--	76.9	5.1
84	51	49	--	78.3	5.7
85	43	57	--	79.0	6.0
86	35	65	--	79.7	6.3
87	26	74	--	80.6	6.4
88	18	82	--	81.3	6.7
89	9	91	--	82.0	7.0
90	1	99	--	82.6	7.4
91	--	93	7	83.3	7.7
92	--	87	13	83.9	8.1
93	--	81	19	84.6	8.4
94	--	76	24	85.1	8.9
95	--	69	31	85.8	9.2
96	--	62	38	86.5	9.5
97	--	55	45	87.1	9.9
98	--	48	52	87.8	10.2
99	--	39	61	88.7	10.3
100	--	31	69	89.5	10.5
101	--	23	77	90.4	10.6
102	--	14	86	91.4	10.6
103	--	5	95	92.6	10.4

TABLE C-III

SENSITIVITIES OF 1984 AND 1983 FBRU AND FBRSU FUELS

Research Octane No.	FBRU			FBRSU		
	1984	1983	Δ	1984	1983	Δ
78	4.2	3.8	0.4	6.1	6.3	-0.2
80	4.7	4.2	0.5	6.2	6.8	-0.6
82	5.1	4.6	0.5	6.8	7.0	-0.2
84	5.7	5.1	0.6	7.6	7.6	0.0
85	6.0	5.4	0.6	7.7	7.9	-0.2
86	6.3	5.7	0.6	8.0	8.2	-0.2
87	6.4	6.1	0.3	8.3	8.5	-0.2
88	6.7	6.4	0.3	8.6	8.7	-0.1
89	7.0	6.8	0.2	9.0	9.0	0.0
90	7.4	7.2	0.2	9.4	9.3	0.1
91	7.7	7.5	0.2	9.7	9.7	0.0
92	8.1	7.9	0.2	10.0	10.1	-0.1
93	8.4	8.3	0.1	10.4	10.5	-0.1
94	8.9	8.6	0.3	10.8	10.9	-0.1
95	9.2	9.0	0.2	11.1	11.2	-0.1
96	9.5	9.3	0.2	11.4	11.5	-0.1
97	9.9	9.7	0.2	11.8	11.8	0.0
98	10.2	10.0	0.2	12.1	12.1	0.0
99	10.3	10.2	0.1	12.3	12.4	-0.1
100	10.5	10.5	0.0	12.7	12.7	0.0
101	10.6	10.7	-0.1	12.8	12.9	-0.1
102	10.6	10.8	-0.2	12.8	13.1	-0.3
103	10.4	--	--	12.8	--	--

TABLE C-IV

SUPPLIERS' FUEL INSPECTIONS

COMPARISON OF 1984 AND 1983 FBRSU FUELS

	Low-Octane Base Blend		Intermediate-Octane Base Blend		High-Octane Base Blend	
	RMFD 353-84	RMFD 347-83	RMFD 354-84	RMFD 348-83	RMFD 355-84	RMFD 349-83
Laboratory Inspection						
Distillation, °F						
IBP	103	93	101	97	99	97
10% Evap.	133	126	124	124	130	136
30% Evap.	176	174	163	167	189	186
50% Evap.	212	217	220	217	240	215
70% Evap.	250	263	281	269	261	268
90% Evap.	344	345	353	331	295	325
End Point	414	420	414	415	365	425
Gravity, °API	61.9	62.9	59.6	57.8	46.9	45.8
RVP, psi	7.4	8.1	9.0	8.8	8.5	8.8
Lead, g/gal.	<0.03	<0.003	<0.03	<0.003	<0.03	<0.003
Oxidation Stabilitiy, hr.	>24	>24	>24	>24	>24	>24
Hydrocarbon Type, Vol. %						
Aromatics	23	18	32	39	61	62
Olefins	20	27	8	5	1	2
Saturates	57	55	60	56	38	36
Research Octane Number	77.5	76.2	90.1	90.2	103.8	102.2
Motor Octane Number	71.8	70.4	80.8	80.5	90.6	89.1
Sensitivity	5.7	5.8	9.3	9.9	13.2	13.1

TABLE C-V

OCTANE NUMBERS AND COMPOSITIONS FOR 1984 FBRSU FUELS

	Blending Data Composition, Volume Percent				
RON	RMFD 353-84	RMFD 354-84	RMFD 355-84	MON	SEN
78	98	2	--	71.9	6.1
80	82	18	--	73.8	6.2
82	66	34	--	75.2	6.8
84	53	47	--	76.4	7.6
85	44	56	--	77.3	7.7
86	36	64	--	78.0	8.0
87	28	72	--	78.7	8.3
88	19	81	--	79.4	8.6
89	11	89	--	80.0	9.0
90	2	98	--	80.6	9.4
91	--	95	5	81.3	9.7
92	--	88	12	82.0	10.0
93	--	82	18	82.6	10.4
94	--	76	24	83.2	10.8
95	--	69	31	83.9	11.1
96	--	61	39	84.6	11.4
97	--	54	46	85.2	11.8
98	--	46	54	85.9	12.1
99	--	38	62	86.7	12.3
100	--	31	69	87.3	12.7
101	--	22	78	88.2	12.8
102	--	13	87	89.2	12.8
103	--	3	97	90.2	12.8

APPENDIX D

PROGRAM

COORDINATING RESEARCH COUNCIL
INCORPORATED
219 PERIMETER CENTER PARKWAY
ATLANTA, GEORGIA 30346
(404) 396-3400

PROGRAM

for the

1984 CRC OCTANE NUMBER REQUIREMENT SURVEY

CRC Project No. CM-123-84

January 1984

TABLE OF CONTENTS

I. INTRODUCTION

The 1984 program of the CRC Light-Duty Octane Number Requirement Survey Group will consist of a survey of the octane number requirements of 1984 model domestic and imported vehicles. For the purposes of this program, the designation "passenger vehicles" will include passenger cars, light-duty (<8500 lb/3856 kg GVW) pickup trucks, and vans. Approximately 400 vehicles will be tested. Most of these vehicles will be sampled in proportion to their relative production or import volume, to provide data from which to estimate the distribution of octane number requirements for the 1984 model vehicle population in the United States. In addition, select models of special interest will be tested in sufficient numbers to estimate their requirement distributions.

Knocking characteristics will be investigated with three series of reference fuels. Tank fuel knock will also be evaluated. Maximum octane number requirements, whether at maximum-throttle or part-throttle, will be established for each vehicle using high sensitivity unleaded full-boiling range reference (FBRSU) fuels, average sensitivity unleaded full-boiling range reference (FBRU) fuels, and primary reference (PR) fuels. If the maximum requirement is at maximum-throttle, then part-throttle requirements are investigated with only FBRU fuels of up to, and including, four octane numbers lower than the maximum requirement.

Octane requirements throughout the speed range will be obtained with PR fuels only.

II. GEOGRAPHICAL AREAS

As in previous years, the 1984 Survey will be conducted on a nationwide basis. The country has been divided into four geographical areas. Participants located in New York, New Jersey, Delaware, and Pennsylvania have been included in the Eastern Area; those located in Ohio, Michigan, and Kentucky comprise the East Central Area; those in Illinois, Texas, and Oklahoma comprise the West Central Area; and California participants make up the Western Area. A coordinator has been appointed for each area as follows:

Eastern Area.....W. J. Most
East Central Area.....D. P. Barnard
West Central Area.....J. B. Baker
Western Area.....T. Wusz

The area coordinators will contact their area participants periodically regarding the progress of the survey. To expedite this, it is suggested that participants send copies of all correspondence concerning the survey to the area coordinators. This program outlines the survey in broad terms. If more detailed information is desired, it is suggested that the participant contact his area coordinator.

III. VEHICLES

A total of approximately 400 vehicles will be tested in the 1984 Survey. 1983 experience indicates we can expect 11 full participants and 5 partial participants. By assigning 30 cars per full participant and 70 cars for the partial participants, the 400-car total is obtained. These will be divided into two groups: (1) the statistical group, sampled in proportion to US car model production or import volume, and (2) select models of special interest. Approximately 20 of each of these select models will be tested to provide an estimate of the octane requirement distribution of each model. Some of these 20 vehicles will be those already included in the statistical group, and the remainder will be additional vehicles added to the program.

The desired number of vehicles to be tested in each category is as follows:

Statistical Group	350
Additional Select Model Group	50
Total	400

A detailed breakdown of the specific models and the number of each model to be tested will be circulated to the participants in May 1984 after an estimate of vehicle model production has been obtained. Design specifications for select models to be tested in the 1984 Survey are shown in Table I. Selection of these vehicles has been based on new or modified design characteristics that might have a significant effect on octane number requirements and high sales volume which allows individual treatment without additional testing.

Wherever possible, specific vehicle assignments to individual participating laboratories will be made in a pattern which tends to minimize data bias. This will be accomplished by apportioning cars of a given model among the four geographical areas, and subsequently among the laboratories within each area, in order to minimize the effect of non-random factors on the results of the Survey.

IV. FUELS

A. Full-Boiling Range Reference Fuels

Two full-boiling range reference fuel series will be used to define the vehicle octane number requirements. The two series will be unleaded and of varying sensitivity. One series will be comparable to the average sensitivity of unleaded commercial fuels (FBRU); the other series (FBRSU) will be about two numbers higher in sensitivity than the FBRU fuels. The Research octane number (RON) range for both fuel series is 77 to 104.

The two series will be blended in increments of two RON up to 84, and one RON above 84 from three base fuels for each series. The base fuels are compounded from normal refinery gasoline components. Limiting specifications for each base fuel for both series are shown in Table II.

Research and Motor ratings will be determined for incremental blends of each fuel series by all participants to provide data for establishment of blending curves. The average ratings and blending curves will be circulated to all participants.

B. Primary Reference Fuels

Blends of ASTM-grade isooctane and normal heptane will be prepared in two octane number increments from 76 to 82, and one octane number increments from 82 to 100.

C. Tank Gasoline

Research and Motor octane ratings will be obtained only on gasoline samples from the tank of vehicles with owner questionnaire (Attachment 1). Owner's Questionnaire should be obtained only if:

a) vehicle has a regular driver;

b) the ignition timing is within $\pm$ 2° of the manufacturer's specifications.

V. TEST TECHNIQUE

All tests are to be conducted using the technique entitled, "Technique for Determination of Octane Number Requirements of Light-Duty Vehicles" (CRC Designation E-15-84). A copy of this technique is included as Attachment 2 to this program. Octane number requirement investigations are to be conducted in all vehicles under level road conditions. Any vehicle obviously in poor mechanical condition or with malfunctioning emission control devices should not be considered for test work. The vehicles must have a minimum of 6000 deposit miles (9656 km), and preferably be privately owned and operated. Vehicles previously used for fuel road octane rating must not be employed in this survey.

Data should be reported on each vehicle tested, even though knock was not encountered on any of the fuels.

The order in which the fuels are to be tested is as follows:

1) Tank fuel;
2) FBRSU;
3) FBRU;
4) PR.

VI. DATA FORMS

The test results on each vehicle will be reported on data forms DFMF-11-1184, DFMF-12-1184, and DFMF-19-1184. For knock sensor-equipped vehicles, two DFMF-11-1184 data forms should be filled out completely: one for maximum requirement, and one for minimum requirement. Copies of these forms will be mailed to all participants from the CRC office with instructions for their use. Additional instructions are included in the E-15-84 technique.

VII. REPORTING RESULTS

The data forms for each vehicle tested should be submitted to the Coordinating Research Council, Inc., 219 Perimeter Center Parkway, Atlanta, Georgia 30346, as soon as possible, but not later than October 31, 1984.

TABLE I

DESIGN SPECIFICATIONS FOR 1984 SELECT MODELS

Make & Model	Engine Displ. Litres	No. of Cylinders	Carb. Bbls.	Comp. Ratio	BHP	Transmission Type
Chrysler E.S./Dodge 600	2.2	4	TBI	9.0	99	Automatic
Tempo/Topaz	2.3	4	2	9.0	85	Automatic
Pontiac 6000/Cutlass Cierra/Century	2.5	4	TBI	9.1	92	Automatic
Fiero	2.5	4	TBI	9.1	92	Manual

TABLE II

LIMITING SPECIFICATIONS FOR 1984 FULL-BOILING RANGE REFERENCE FUELS*

Inspection Tests	Unleaded Average Sensitivity Reference Fuels (FBRU) RMFD 350		RMFD 351	RMFD 352	Unleaded High Sensitivity Reference Fuels (FBRSU) RMFD 353	RMFD 354	RMFD 355
ASTM Distillation, °F(°C)							
IBP, Min.	90	(32.2)	90	90	90	90	90
10% Evap.	115-158	(46.1- 70.0)	115-158	115-158	115-158	115-158	115-158
30% Evap.	150-190	(65.6- 87.8)	150-190	150-190	150-190	150-190	150-190
50% Evap.	195-250	(90.6-121.1)	195-250	195-250	195-250	195-250	195-250
70% Evap.	230-300	(110.0-148.9)	230-300	230-300	230-300	230-300	230-300
90% Evap.	285-374	(140.6-190.0)	285-374	285-374	285-374	285-374	285-374
End Point, Max.	437	(225)	437	437	437	437	437
RVP, psi (KPa)	7-9	(48-62)	7-9	7-9	7-9	7-9	7-9
Lead, g/gal (g/l)	<0.03	(<0.008)	<0.03	<0.03	<0.03	<0.03	<0.03
Oxidation Stability, Minutes, Min.	1440		1440	1440	1440	1440	1440
Hydrocarbon Type, Vol. %							
Aromatics, Max.**	20		35	55	35	45	65
Olefins, Max.	20		15	10	35	25	15
Saturates	Remainder		Remainder	Remainder	Remainder	Remainder	Remainder
Octane Number							
Research	77 ± 1		90 ± 1	104 ± 1	77 ± 1	90 ± 1	104 ± 1
Sensitivity***	4.0 ± .5		7.7 ± .5	11.0 ± .5	6.0 ± .5	9.7 ± .5	13.0 ± .5
Color	Clear		Green	Red	Yellow	Deep Purple	Light Blue

Note: All fuels to contain minimum 5 PTB of a 100% active antioxidant and 5 PTB of corrosion inhibitor. No manganese added.
Confirmation of product quality of fuel blends to be approved by a six-laboratory CRC Fuel Acceptance Panel prior to drumming.
Minimum of two units sensitivity difference between corresponding fuels of each series.

* To be compounded from normal refinery components. Oxygenates are not to be used as fuel components.
** 1% maximum Benzene or legal.
*** Sensitivities are shown for the mean Research octane number.

CRC OCTANE NUMBER REQUIREMENT SURVEY

OWNER'S QUESTIONNAIRE

OWNER:

Your vehicle is being tested for fuel octane number requirements by a Coordinating Research Council activity. To help analyze the data, we would like the person who has recently been driving the vehicle to answer the following questions:

1. What grade of unleaded fuel do you normally use?

☐ Regular ☐ Premium ☐ Mixture

2. Has any engine knock (ping) been encountered with the fuel that is now in the tank?

☐ Yes ☐ No

3. Did you consider the knock (ping) objectionable?

☐ Yes ☐ No

Vehicle Make _____ License No. _____

Vehicle Identification No. _____

TECHNIQUE FOR DETERMINATION OF OCTANE NUMBER REQUIREMENTS OF LIGHT-DUTY VEHICLES

(CRC Designation E-15-84)

January 1984

(Revised June 7, 1984)

TECHNIQUE FOR DETERMINATION OF OCTANE NUMBER REQUIREMENTS OF LIGHT-DUTY VEHICLES

(CRC Designation E-15-84 - Including Annex A)

A. GENERAL

The technique provides for the determination of maximum octane number requirements (and minimum octane number requirements for vehicles equipped with knock sensors), whether at maximum-throttle or part-throttle, of a vehicle in terms of borderline spark knock on two series of full-boiling range reference fuels as well as on primary reference fuels. If the maximum requirement is at maximum-throttle, then part-throttle requirements are investigated with only FBRU fuels of up to, and including, four octane numbers lower than the maximum requirement. It also provides octane requirements throughout the speed range on primary reference fuels.

Spark knock of tank fuel will also be determined.

B. DEFINITION OF TERMS

The following definitions of knock, approved by the CLR and CFR Committees on June 8, 1954, have been rephrased for clarification and adaptability to current technology by the Survey Steering Panel.

1. Spark Knock:

Spark knock is the noise associated with autoignition* of a portion of the fuel-air mixture ahead of the advancing flame front. It is recurrent and repeatable in terms of audibility and fuel octane quality.

2. Knock Intensity

a. Borderline Knock

This means spark knock of lowest audible intensity of at least three (3) pings, and over a range of engine speed of at least 50 rpm, all being repeatable during subsequent accelerations.

---

* Autoignition: The spontaneous ignition and the resulting very rapid reaction of a portion or all of the fuel-air mixture. The flame speed is many, many times greater than that which follows normal spark ignition. There is no time reference for autoignition.

b. No Knock

This means either no audible knock or less than borderline knock.

c. Above Borderline Knock

This means spark knock of greater than borderline intensity.

3. Octane Number Requirements

a. Maximum Requirement

This is equivalent to the octane number of the highest reference fuel giving borderline knock as previously defined (the next higher fuel gives no knock). If the knock intensity with the highest fuel giving knock is above borderline, the maximum requirement shall be equivalent to the mid-point between the octane number of the fuel giving knock and that of the next higher fuel which gives no knock.

b. Minimum Requirement (for vehicles with knock sensors)

This is equivalent to the octane number of the lowest reference fuel giving borderline knock (the next lower fuel will give above borderline knock).

4. Definition of Accelerations

Accelerations are made at maximum-throttle and part-throttle conditions which are defined below:

a. Maximum-Throttle

The throttle is depressed and held at either full-throttle or the widest throttle position that does not cause the transmission to downshift (detent) throughout the acceleration in each of the required test gears listed in D.3.d.(1)(a). The detent manifold vacuum/pressure obtainable on a given model is determined by the transmission characteristics. For manual transmissions, the throttle is depressed fully throughout the acceleration.

b. Part-Throttle

The throttle is depressed and regulated throughout the acceleration to maintain a desired, constant critical manifold vacuum as defined in D.3.d.(1)(d).

C. VEHICLE PREPARATION

The following vehicle preparation steps should be completed before any octane tests are run. Detailed procedures for each adjustment can be found in the manufacturers' shop manuals.

1. Record vehicle identification number and emission control type, Federal, Altitude, or California. Fill in heading on data sheet DFMF-11-1184. For knock sensor-equipped vehicles, two DFMF-11-1184 data sheets should be filled out completely: one for maximum requirement, and one for minimum requirement. Ford emission calibration numbers are to be recorded.

2. Inspect all vacuum lines and air pump hoses for appropriate connections. Also, check to see if PCV valve, spark advance vacuum delay controls, EGR valve, knock sensors, and heated inlet air mechanism are functioning. Engine must be warmed up for these checks.

3. Record engine idle speed and observe anti-dieseling solenoid operation. Adjust to manufacturers' recommended specifications as specified on the under-hood decal.

4. Observe and record basic spark timing at recommended engine speed. Adjust to manufacturers' recommended setting as specified on the under-hood decal.

5. Crankcase oil, radiator coolant, automatic transmission fluid, and battery fluid levels shall be maintained as recommended by the manufacturer.

6. A calibrated tachometer graduated in 100 rpm (or smaller) increments and capable of indicating engine speed from 0-5000 rpm shall be installed on each vehicle.

7. One calibrated vacuum gage, graduated in one-half inch of mercury (or smaller) increments and capable of indicating vacuum from 0-24 inches of mercury (0-81 kPa) shall be connected to the intake manifold. For vehicles with turbochargers, a compound vacuum/pressure gage should be used; the pressure side of the gage should be capable of indicating pressures up to 15 psi (103 kPa).

8. An auxiliary fuel system shall be provided to supply test fuels to the engine. Caution shall be taken to avoid placing auxiliary fuel lines in locations which promote vapor lock. If vehicles with carbureted engines have tank return fuel lines, this return line should be blocked off. Disconnect fuel tank vent line at evaporation control system canister. Instructions for fuel handling with fuel injection systems are given in Attachment A.

9. For vehicles with owner questionnaire completed, a sample of the tank gasoline shall be withdrawn for determination of Research and Motor method octane number ratings. If insufficient fuel is available, omit this step and obtain tank fuel observations as described in Item D.3.d.(2).

D. TEST PROCEDURE

1. Engine Warm-Up

a. To stabilize engine temperatures, a minimum of ten miles of warm-up is required. The test vehicle should be operated at 55 mph (88 kph) in top gear with a minimum of full-throttle operation.

b. During the warm-up period, the general mechanical condition of the vehicle should be checked to insure satisfactory and safe operation during test work.

2. Fuel Changeover

Caution: Because of the installation of catalytic devices on these vehicles, permanent damage may result if the engine runs lean or stalls. Therefore, changeover from one fuel to another must be accomplished without running the carburetor or fuel injection system dry. Fuel handling procedures for vehicles equipped with fuel injection systems are explained in Annex A.

To eliminate contamination of the new fuel with residual amounts of the previous fuel, flush system twice with new fuel.

After fuel changeover, make one maximum-throttle acceleration before beginning Vehicle Rating Procedure.

3. Details of Observations

a. Operating Conditions

All octane number requirements will be determined under level road acceleration conditions.

Tests will be conducted on moderately dry days, preferably at ambient temperatures between 60°F (15.5°C) and 90°F (32.2°C). Tests should not be conducted during periods of high humidity such as prevail when rain is threatening or during or immediately after a rain storm. Laboratories with control capabilities should target for 70°F (21°C) air temperature and 50 grains of water per pound (7.14 gm/kg) of dry air whenever possible.

Air-conditioned vehicles will be tested with air conditioner turned ON. (Normal setting, minimum temperature, low fan.) Air conditioner will be ON at all times.

b. Order of Fuel Testing

1) Tank
2) FBRSU
3) FBRU
4) Primary

c. Determination of Knock Intensity

Maximum octane requirements will be established by evaluating the occurrence of knock in terms of knock intensity: "N" for none, "B" for borderline, and "A" for above borderline. Establishment of representative knock intensity for a given fuel will be accomplished with a maximum of three (3) rated accelerations. Coastdown time between the end of one acceleration and the beginning of the next should be approximately twenty (20) seconds. As defined below, the first two duplicating accelerations are sufficient with "N" and "B" intensity.

Acceleration Number			Representative Rating
1	2	3	
N	N	-	N
N	B	N	N
N	B	B	B
B	N	B	B
B	B	-	B
B	A	-	A
A	-	-	A

All subsequent accelerations will normally be discontinued when "A" knock intensity is experienced, and testing continued with a higher octane number fuel in that series. An exception will be made if "A" knock is experienced on the highest octane fuel which knocks in the engine. In this case, it may be necessary to run additional accelerations to determine the speed of maximum knock intensity. If "A" knock is experienced at initiation of acceleration, as limited by transmission characteristics, this speed will be considered the speed of maximum knock. Otherwise, the midpoint between knock-in and knock-out will be considered the speed of maximum knock. When establishing knock-in and knock-out, back off on the throttle between points to eliminate "A" knock.

Minimum octane number requirements (for vehicles equipped with knock sensors) will be established in a similar manner except that when "A" knock intensity is encountered, subsequent accelerations will be made with a given fuel until duplicate "A" ratings are obtained over a measurable range of engine speeds as indicated below:

Acceleration Number			Representative Rating
1	2	3	
B	A	B	B
B	A	A	A
A	A	-	A
A	B	B	B

d. Determination of Octane Requirements

Tests should be run to 60 mph (97 kph) unless required to terminate at 55 mph (88 kph) because of legal speed limits.

(1) Vehicle Operating Procedure

(a) Establishment of Automatic Transmission Characteristics (for Maximum-Throttle Accelerations)

Obtain the transmission downshift characteristics of engine rpm and manifold vacuum/pressure at 25, 35, 45, and 55 mph (40, 56, 72, and 88 kph) incremental speeds (as obtainable in each gear), by movement of the throttle through the detent, i.e., downshift, throttle position. Also determine the minimum attainable road speed. These characteristics are to be determined for each of the gears specified in the table below. For transmissions with converter clutches, determine the minimum road speed for clutch application. At this initial speed and at 10 mph (16 kph), increments up to about 60 mph (97 kph) determine minimum vacuums (pressures) for application. Record all road speed/engine rpm/vacuum or pressure measurements from above on data sheet.

Do not use brakes, turn signals or hazard flashers during accelerations as these may affect electronic engine controls.

The selection of required test gears, and test gear/converter clutch combinations (if applicable) for various types of transmissions are listed below. Transmissions not explicitly described should be tested in a manner as similar as possible to those listed. Automatic transmission vehicles should be tested with the gear selector in D or O.

TRANSMISSION GEAR SELECTION

AUTOMATICS

Place the selector in "D" or "O" and check for critical condition.

Type	Gears to be Tested
GM 4-speed	4th gear, converter clutch engaged 3rd gear, converter clutch disengaged 2nd gear, converter clutch disengaged
GM 3-speed	3rd gear, converter clutch engaged 3rd gear, converter clutch disengaged 2nd gear, converter clutch disengaged
Ford 4-speed overdrive	4th gear 3rd gear 2nd gear
Other 3-speed	3rd gear 2nd gear

MANUALS

5-speed	4th and 3rd gears
4-speed	4th and 3rd gears
3-speed	3rd and 2nd gears

(b) Maximum-Throttle Accelerations - Automatic Transmissions

For maximum-throttle accelerations in each of the gears and gear/converter clutch combinations specified above, accelerate at the detent/application condition according to the speed versus vacuum/pressure profiles determined in (a) from the minimum obtainable speed up to 60 mph (97 kph). If the transmission downshifts, abort and start the acceleration again. Start with the highest gear or gear/clutch combination and proceed in descending order.

(c) Maximum-Throttle Accelerations - Manual Transmissions

Select the highest gear as specified in the table above. Start at the lowest speed from which the vehicle will accelerate smoothly or 30 mph (48 kph), whichever is higher, and depress the throttle full throughout the acceleration up to 60 mph (97 kph).

Select the next lower gear specified in the table above and accelerate at full throttle from the minimum speed from which the vehicle will accelerate smoothly up to 60 mph (97 kph).

(d) Part-Throttle Accelerations (Both Automatic and Manual Transmissions)

Select the highest gear up to the minimum vehicle speed at which the converter clutch will engage, and the highest gear/converter clutch combination above this minimum speed, to obtain the critical part-throttle vacuum or pressure. To obtain the critical part-throttle vacuum/pressure, first operate at road load (constant speed), at 25, 35, 45, and 55 mph (40, 56, 72, and 88 kph) incremental speeds (if obtainable in the specified gear). At each speed, move the throttle (in 3 to 5 seconds) from the road-load vacuum to:

1. one inch Hg (3.4 kPa) above full-throttle vacuum for manual transmissions;

2. one inch Hg (3.4 kPa) above detent vacuum for automatic transmissions without converter clutches;

3. one inch Hg (3.4 kPa) above the minimum vacuum at which the converter clutch disengages for so-equipped automatic transmissions.

The vehicle brakes may be applied lightly, if necessary, to maintain vehicle speed during throttle fanning, except for vehicles with converter clutch transmissions or EGR cut-outs.

If knocking occurs within any of the vacuum/pressure ranges, establish the manifold vacuum/pressure which gives maximum knock intensity on each fuel series. This is the critical vacuum/pressure to be used for all subsequent constant-vacuum/pressure part-throttle accelerations from the minimum obtainable speed in the test gear to 60 mph (97 kph), or until the vehicle ceases to accelerate. This critical vacuum/pressure should be determined for each reference fuel series.

(2) Tank Fuel Observations on Vehicles with Owner's Questionnaire

Investigate for maximum-throttle and part-throttle knock as detailed in Item 3d(1). Define maximum knock intensity as per Item 3c. Record maximum knock intensity, speed of maximum knock intensity, and manifold vacuum/pressure at each operating condition.

(3) Vehicle Rating Procedure (for Rater)

Knock rating should be performed while in a normal seated position (head above instrument panel) with floor mats in place.

Step 1 - After Tank Fuel Observations, use a fuel estimated to give borderline knock in a given fuel series and investigate for incidence of knock under conditions as described in D.3.d.(1)(b) above, and D.3.d.(1)(c) above, whichever is applicable.

Step 2 - If no knock occurs, go to a lower octane number blend in that series and repeat Step 1.

Step 3 - If knock occurs at one or more of the operating conditions in Step 1, continue investigation at the critical condition(s) with higher octane blends until highest octane fuel giving knock is determined within one octane number or one blend (the next higher fuel gives no knock). Record maximum knock intensity on all fuels. Record speed of maximum knock intensity and manifold vacuum (pressure) on highest octane fuel that knocks.

Step 4 - Using the lowest octane blend that did not knock in Step 3, investigate for incidence of part-throttle knock as described in D.3.d.(1)(d). If knock occurs, continue investigation at critical vacuum/pressure until requirement is defined. Record maximum knock intensity and critical manifold vacuum/pressure on all fuels, and speed of maximum knock intensity on highest octane fuel that knocks.

Step 5 - With FBRU fuel only, if no knock occurs in Step 4, go to a lower octane number blend and repeat Step 4. Discontinue part-throttle investigation if knock is not observed with a fuel four octane numbers lower than determined in Step 3.

Step 6 - For knock sensor-equipped vehicles after determination of maximum requirement, continue with lower octane blends until the lowest octane fuel giving borderline knock is determined.

The rating procedure is given in arrow diagram form on page D-26 for maximum requirement, and on page D-27 for minimum requirement, for knock sensor-equipped cars.

(4) Octane Number Requirement Over Speed Range

Octane requirements over the speed range will be obtained on primary reference fuels only, using throttle position for maximum requirements. These will be established by recording the knock-in and knock-out points during maximum requirement accelerations with each incremental fuel investigated. It may be necessary to test one or two additional lower octane fuels to describe the knocking characteristics over the speed range. Accelerate at maximum requirement throttle position from minimum obtainable speed as determined in 3d(1)(a), up to 3750 rpm, if necessary, in order to define requirements. These should be run to 60 mph (97 kph) unless required to terminate at 55 mph (88 kph) because of legal speed limits. If 3750 rpm cannot be attained in top gear, accelerations shall be discontinued and resumed in the next highest gear from 500 rpm below the engine speed at which top gear accelerations were determined.

When "A" knock is experienced, continue the acceleration, but back off on the throttle to maintain "B" knock until just prior to the knock-out point.

E. INTERPRETATION OF DATA

The data will be recorded on data sheet DFMF-11-1184. For knock sensor-equipped vehicles, two DFMF-11-1184 data forms should be filled out completely: one for maximum requirement, and one for minimum requirement. Octane requirements for all reference fuels shall be determined as follows:

1. If the knock intensity of the highest reference fuel giving knock is borderline, the requirement shall be reported as the octane number of that fuel.

2. If the knock intensity of the highest fuel giving knock is above borderline, the requirement shall be reported as the mid-point between the octane number of the fuel giving knock and that of the next higher fuel.

3. If the octane requirement in high gear is equal to the requirement in a lower gear, report the highest gear data.

4. For part-throttle requirements, report the data from the critical manifold vacuum/pressure observations.

5. For knock sensor-equipped vehicles, report the highest and lowest fuel giving borderline knock.

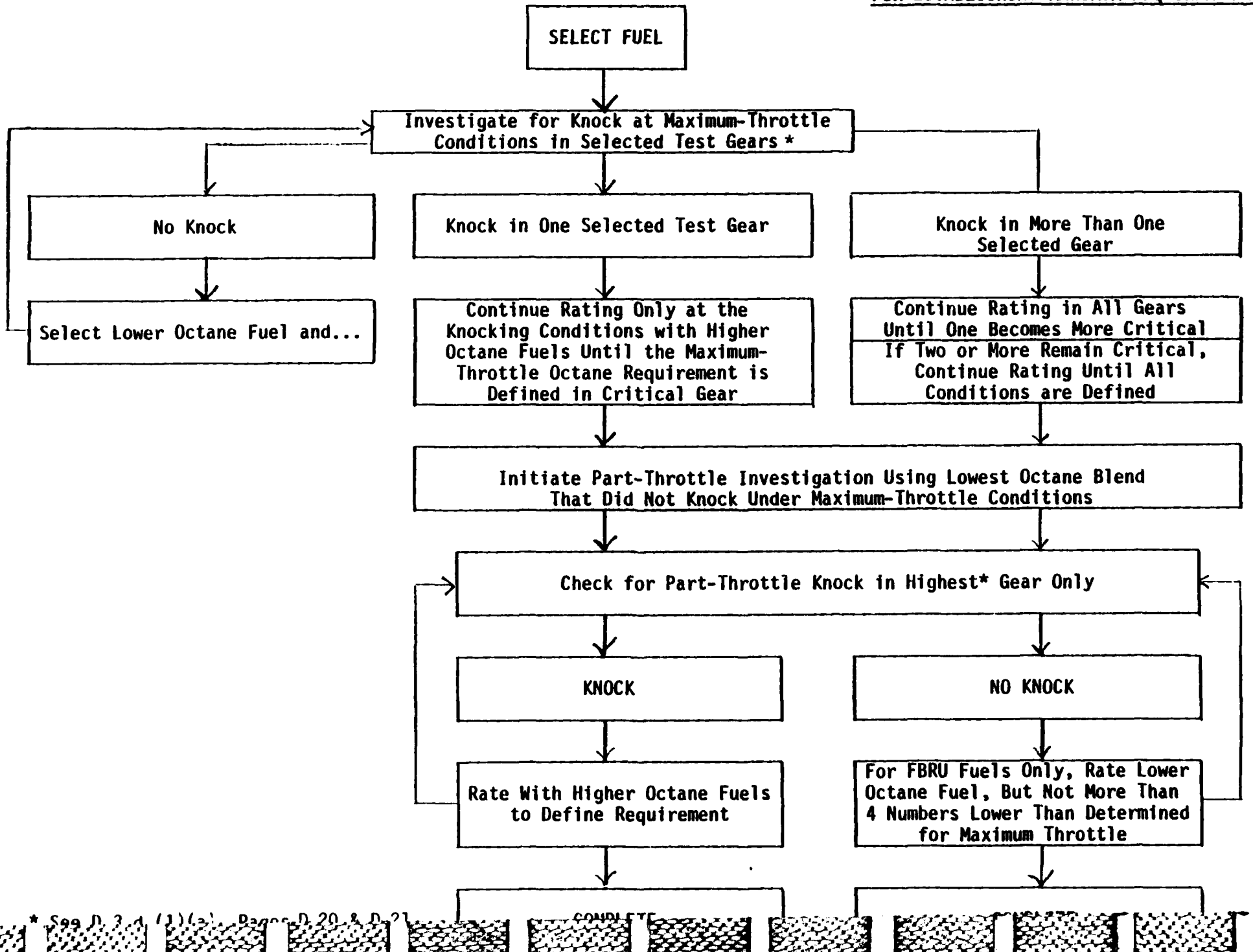
Speed range data shall be reported on data sheet DFMF-11-1184 as the engine speed of knock-in and knock-out for the octane number of the primary reference fuel tested.

Record data on all fuels tested, even though knock was not encountered. When transferring data to the summary block, record the higher requirement, either part-throttle or maximum-throttle condition, for all fuels. If the higher requirement is part-throttle, record the part-throttle FBRU requirement in both the maximum and part-throttle columns. If part-throttle and maximum-throttle requirements are equal on FBRU fuels, record the maximum-throttle data in the maximum-requirement columns and the part-throttle data in the part-throttle columns. Use proper letter designation (see footnotes on data sheet) to designate requirements outside of the reference fuel limits or FBRU part-throttle requirement more than four numbers below maximum.

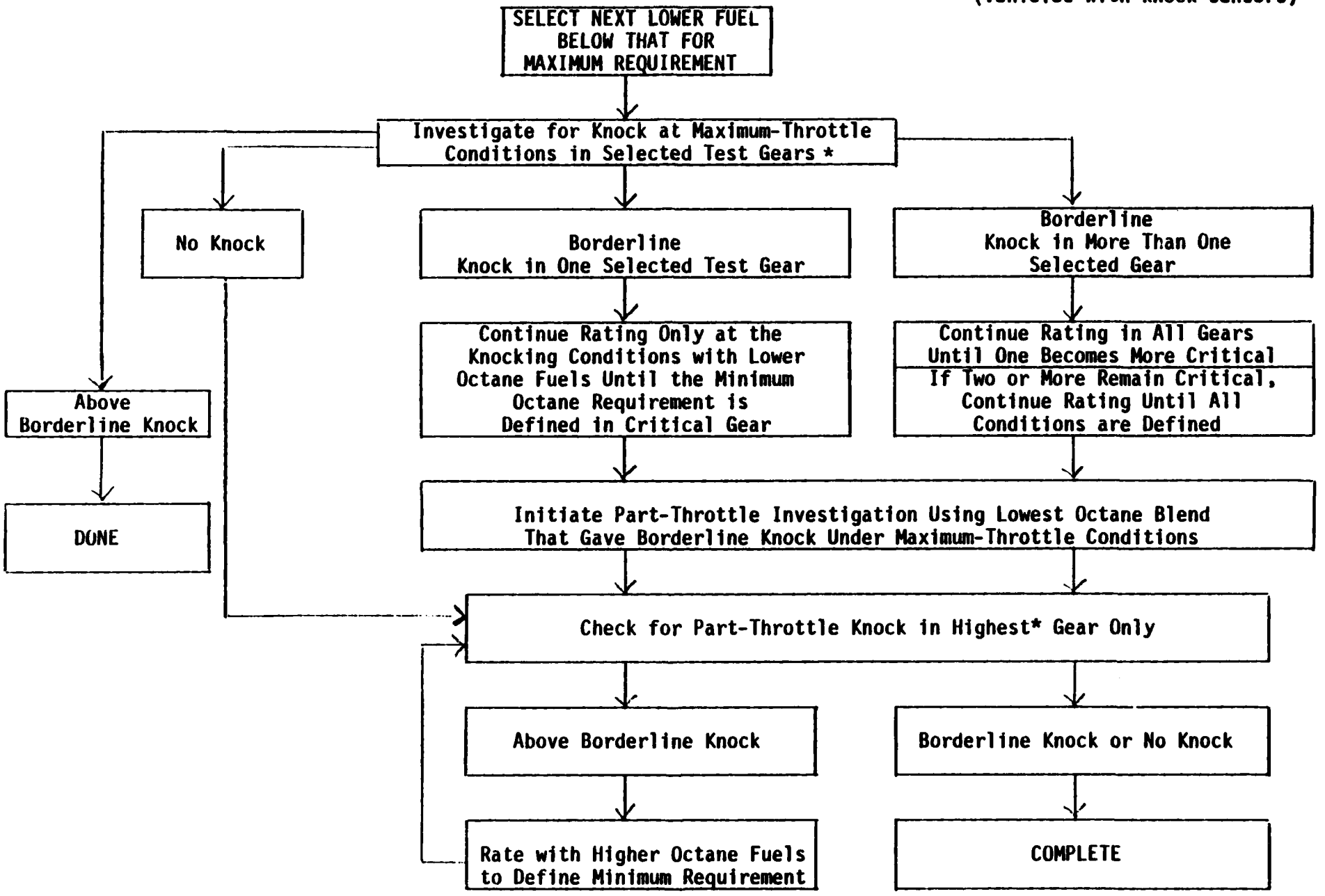
Requirements for the various engine speeds will be determined by fitting a smooth curve through the knock-in and knock-out points on work form DFMF-12-1184. Primary reference fuel requirements at various engine speeds should be reported to the nearest one-half octane number and recorded on the speed range summary block.

It is important that the vehicle identification number (VIN) of each vehicle tested be recorded on all data sheets to provide a means of cross-indexing.

FOR ESTABLISHING MAXIMUM REQUIREMENTS



* See D.3.4.(1)(a), Pages D.20 & D.21



* See D.3.d.(1)(a), Pages D-20 & D-21

ANNEX A

to the

CRC E-15-84 TECHNIQUE

PROCEDURE FOR SETTING UP VEHICLES

WITH FUEL INJECTION

ANNEX A

TO THE CRC E-15-84 TECHNIQUE

PROCEDURE FOR SETTING UP VEHICLES AND HANDLING REFERENCE FUELS -- VEHICLES EQUIPPED WITH MULTIPLE-PORT FUEL INJECTION

1. To run octane requirements on fuel-injected vehicles it is necessary to run an external fuel line to the inlet of the vehicle fuel injection pump.

2. The fuel return line from the engine to the fuel tank must be disconnected after the fuel pressure regulator (in engine compartment) and before the fuel tank. An auxiliary line long enough to reach the cans must be added to the fuel return line.

3. Make certain that the fuel tank connections are plugged; this means both the normal fuel pump inlet line and the normal fuel return line connection. On vehicles with an in-tank booster pump, this pump must be shut off so it cannot run during the time the vehicle is operating on the external fuel system. If this pump is not disconnected, it will be destroyed.

4. An electric fuel pump (Bendix type acceptable) must be used to draw fuel from the reference fuel can to supply the fuel injection pump on the vehicle. Caution must be exercised to keep the fuel line between the reference fuel cans and the vehicle fuel injection pump full of fuel. If very much air gets into this line, the fuel injection system will become air bound and it is difficult to get the air out of the system.

5. Once the fuel injection pump line and return line have been disconnected, all subsequent operations must be done from an external fuel source.

6. It is possible to use three-way valves in the fuel line between the fuel pump and the fuel tank and between the return line and the fuel tank. When used, the operator must change the return line valve to the auxiliary fuel system while the engine is shut down, to avoid building up excessive pressure in the return line which could damage both the fuel pressure regulator and injection pump.

7. When changing from one reference fuel to another, the following steps must be followed:

   a. Put fuel inlet line in reference fuel tank with the return line going to a slop fuel can. Do not keep fuel inlet line out of the fuel can any longer than is necessary to move it from one can to the next. DO NOT RUN OUT OF FUEL.

b. Observe the fuel stream in the fuel return line. As soon as a steady flow of fuel is observed, move the fuel return line to an empty one-quart can (0.946 ℓ). Allow one quart (0.946 ℓ) of fuel to flow into this can before inserting the return line into the chosen reference fuel can. This operation should take about 60 seconds.

c. When going to the next reference fuel, it will be necessary to repeat Steps a and b.

The fuel injection pumps on most vehicles pump between 30 and 50 gallons (114-189 ℓ/h) of fuel per hour. Therefore, Steps a and b should be folowed very closely or there will be gross reference fuel contamination, or you will use a lot more reference fuel than is required to run each test. If Steps a and b are followed exactly, you will be discarding to slop about two quarts (1.892 ℓ) of reference fuel each time you change reference fuels. The two quarts (1.892 ℓ) to slop will be at least as much fuel as is consumed to obtain the reference fuel rating.

CAUTION

For high-pressure fuel systems, be sure to relieve the pressure before disconnecting fuel lines. Also, use auxiliary fuel lines designed for high pressure. The engine and auxiliary fuel pump should be shut off while changing from auxiliary to tank fuels.

Diagnostic scanners should not be used while knock testing.

Auxiliary hoses should be rated for at least 250 psi working pressure and 1000 psi burst pressure.

PROCEDURE FOR SETTING UP VEHICLES AND HANDLING REFERENCE FUELS -- VEHICLES EQUIPPED WITH THROTTLE-BODY FUEL INJECTION

The General Motors throttle-body fuel injection system is shown in the attached schematic drawing. The fuel supply system consists of an in-tank electric fuel pump, a full-flow fuel filter mounted on the vehicle frame, a fuel pressure regulator integral with the throttle body, fuel supply and return lines, and two fuel injectors. The injection timing and amount of fuel supplied is controlled by an electronic control module (not shown in figure). To prepare a vehicle with this system for octane requirement testing, an auxiliary electric fuel pump must be installed. The fuel pressure regulator controls fuel pressure at the injectors to a nominal 10.5 psi; therefore, an auxiliary pump capable of at least 10.5 psi outlet pressure must be used for satisfactory engine operation. The following procedure is recommended for preparing a vehicle with throttle-body fuel injection for octane requirement testing and for changing reference fuels during such testing:

1. Disconnect and plug the fuel supply and fuel return lines at the locations shown in the figure. Install an additional line between the fuel supply line and the outlet of the auxiliary pump. Connect the inlet of the auxiliary pump to the reference fuel can. Connect the fuel return line to the reference fuel can through a tee at the auxiliary pump inlet. All auxiliary fuel lines are indicated by dashed lines in the figure.

2. An optional arrangement would be to use three-way selector valves in the fuel supply and fuel return lines at the locations where auxiliary fuel lines are connected. When these valves are used, the operator must change the valves to the external fuel system while the engine is shut off to avoid building up excessive pressure in the fuel return line.

3. Disconnect the in-tank fuel pump so it cannot run during the time the vehicle is operating on the external fuel system. If this pump is not disconnected, it may be destroyed.

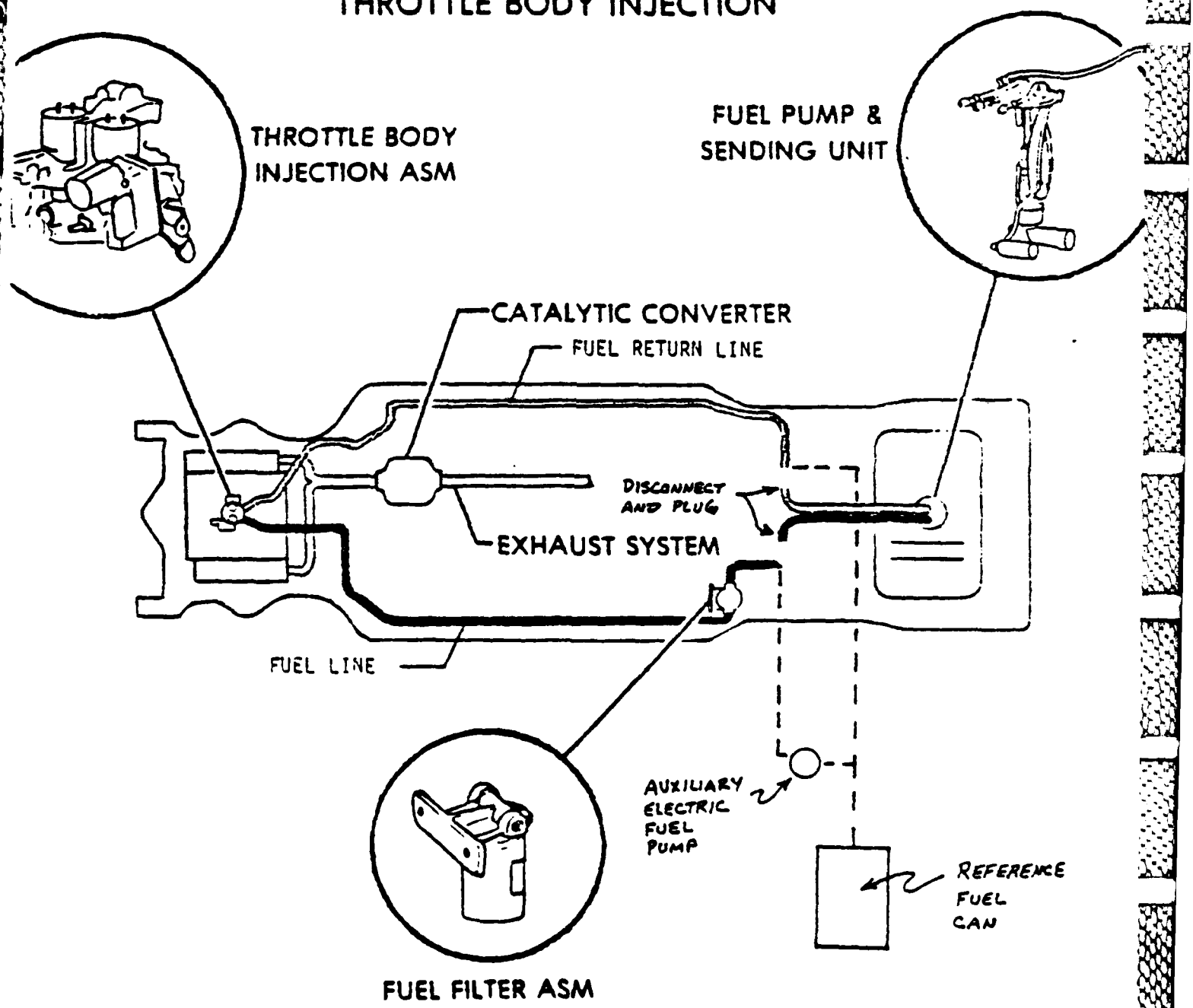
4. When changing from one reference fuel to another, the followign steps should be followed:

   a. Disconenct fuel inlet line from reference fuel can and run engine a short time; do not run out of fuel since this will introduce air into the fuel injection system, and excessive cranking will be required to restart the engine.

   b. Insert fuel inlet line in desired reference fuel can; operate vehicle for two miles at a maximum speed of 55 mph during which time four part-throttle accelerations are made. This must be done to ensure that the vehicle fuel system has been purged and contains the desired reference fuel for octane rating.

   c. When changing to another reference fuel, repeat Steps a and b.

PROCEDURE FOR SETTING UP VEHICLES AND HANDLING REFERENCE FUELS
-- VEHICLES EQUIPPED WITH THROTTLE-BODY FUEL INJECTION - (Continued)



PROCEDURE FOR SETTING UP VEHICLES AND HANDLING REFERENCE FUELS -- FORD VEHICLES EQUIPPED WITH CENTRAL FUEL INJECTION SYSTEM

A vehicle schematic of one of Ford's central fuel injection systems is shown on the following drawing (other systems vary in configuration dependent upon engine/model type - see note 1). This fuel system consists of: an electric in-tank fuel pump, primary and secondary full-flow fuel filters, throttle-body assembly with integral fuel pressure regulator and two fuel injectors, fuel supply and return lines. The following procedure is recommended for preparing the vehicle for octane requirement testing:

1. Relieve pressure in fuel system using valve provided on throttle body. Fuel supply lines will remain pressurized for long periods of time after engine shut down. Disconnect and cap the fuel supply and fuel return lines leading from the fuel tank. Access to connection points may be obtained through either the: rear wheel wells, underbody, or engine compartment, dependent upon vehicle type. Install additional lines to the open supply and return lines and lead these lines back into the vehicle.

2. Connect the added fuel supply line to an auxiliary fuel pump. The fuel pressure regulator in the throttle body controls fuel pressure to a nominal 39.9 psi; therefore, it requires an auxiliary fuel pump capable of providing at least 45 psi outlet pressure (see note 1). The added 5.1 psi is needed to sufficiently overcome the pressure head and line restriction losses. Connect a supply line to the auxiliary pump from the reference fuel can. A fuel filter may be required between the auxiliary pump and reference fuel can to protect the pump. Also, connect the added fuel return line to the fuel reference can and vent the reference can to outside the vehicle.

3. Disconnect the electrical supply to the electric in-tank fuel pump, either by disconnecting the plug on the fuel tank or by disarming the inertia switch located in the trunk. Failure to disarm the in-tank fuel pump may result in a damaged pump. The voltage supplied to the inertia switch may be used as an electrical source for the auxiliary fuel pump. This voltage source is controlled by the on-board computer allowing the auxiliary pump to respond the same as would the in-tank fuel pump. When making this connection, do not "splice" into the wire, instead connect the wire lead to the connector.

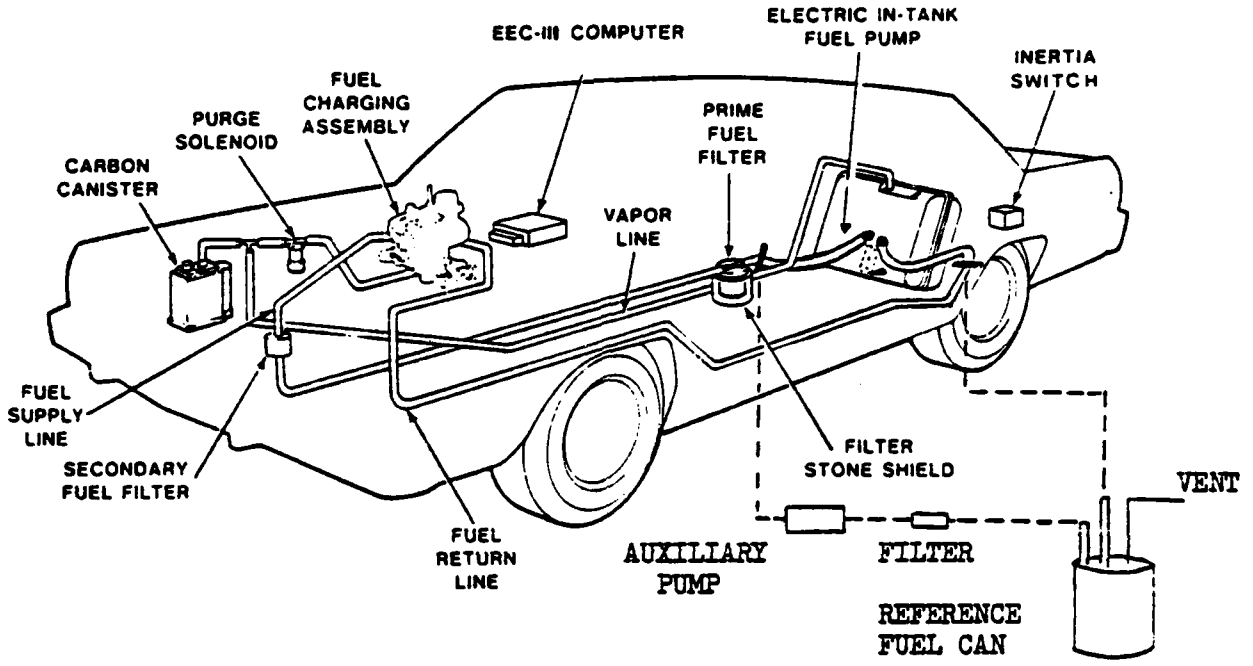
4. When changing from one reference fuel to another, the following steps should be followed, or else reference fuels may become contaminated:

   a. With the engine shut off, disconnect the fuel return line from the reference fuel can and connect it to an extra empty can. Connect the fuel pump supply line to the new reference fuel can and run the engine for approximately 30 seconds, purging the old reference fuel into the extra can (timing is dependent upon length of added fuel lines). After the sytem is purged, shut the engine off and connect the fuel return line to the new reference fuel can forming a closed fuel loop. Now the vehicle is ready to be tested on the desired reference fuel.

   b. When changing to another reference fuel, repeat Step a.

PROCECURE FOR SETTING UP VEHICLES AND HANDLING REFERENCE FUELS
-- FORD VEHICLES EQUIPPED WITH CENTRAL FUEL INJECTION SYSTEM - (Continued)

CENTRAL FUEL INJECTION
FUEL SYSTEM
(5.0L LINCOLN/MARK VI)



1/ NOTE:

Some vehicles have both a low pressure in-tank fuel pump and a high pressure under body fuel pump. The on-board high pressure pump may be used if supplied with an auxiliary pump. In all cases, it is required that on-board pumps not used, be disarmed. The inertia switch located in the rear of the vehicle will disarm both pumps. Fuel lines on some vehicles may be accessed only in the engine compartment, or by dropping the fuel tank.

APPENDIX E

1984 OCTANE NUMBER REQUIREMENT SURVEY DATA

GLOSSARY

(For Appendix E Only)

Emission Certification (EMCT):	A	Altitude
	C	California
	F	Federal
	B	Both California and Altitude
Knock Sensor:	Y	Yes
	N	No
Air Conditioner:	Y	Yes
	N	No
Spark Advance:	+	Before Top Center
	-	After Top Center
Test Fuel:	1	Tank Fuel
	2	FBRSU
	3	FBRU
	4	PR
Octane Number Requirements: (expressed as Research ON)	L	Less than lowest available ON for FBRU and FBRSU fuels and less than 76 for PR fuels
	H	Higher than highest available ON for FBRU and FBRSU fuels and higher than 97 ON for PR fuels
	F	Part-throttle requirement greater than four numbers below maximum-throttle requirement
Noise Type (NTYPE):	K	Spark Knock
Throttle:	M	Maximum
	P	Part
Gear:	1-5	Manual and Automatic
Manifold Vacuum (MV):	Inches Hg, positive (+) for vacuum, negative (-) for pressure	
Owner Reported Knock (OWKNK):	Y	Yes, Not Objectionable
	O	Objectionable
	N	No
Rater-Reported Noise Intensity (NINT):	N	None
	B	Borderline
	A	Above Borderline

		VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA									TANK FUEL INFORMATION								
													MAXIMUM					PART THROTTLE							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
32	8	BA7 F17A3	F	N	8.2	Y	+ 3	+ 3	14283	75	29.82	76	3	87.0	K	M	2	3000	0.6	F				1			N				
													2	89.0	K	M	3	2850	0.9												
													4	84.0	K	M	2	3000	0.6												
349	6	BA7 F17M4	F	N	8.2	N	+ 2	+ 2	7493	63	30.12	77	3	79.0	K	M	4	3000	0.4					1	N	93.3	83.6	N				
													2	80.0	K	M	3	3300	0.4												
													4	79.0	K	M	4	2300	0.4												
135	26	BA8 F18M5	F	N	8.5	Y	+ 6	+ 6	9291	80	30.01	78	3	91.0	K	M	4	1950	0.5	F				1	N	91.5	82.4	B	K	4	1950	0.5
													2	91.0	K	M	4	2050	0.5												
													4	88.0	K	M	4	2200	0.5												
66	5	DED F22A3	F	N	9.0	Y	+ 6	+ 6	11096	70	30.10	55	3	97.0	K	P	3	1750	8.5	97.0	3	1750	8.5	1							
													2	99.0	K	P	3	1750	8.5												
													4	94.0	K	M	2	1525	1.0												
173	4	DED F22A3	F	N	9.0	Y	+ 6	+ 6	6686	82	29.36	45	3	89.0	K	M	2	2100	0.5	87.0	3	1950	2.0	1	N	91.7	83.8	N				
													2	91.0	K	M	2	2100	0.5												
													4	88.0	K	M	2	2100	0.5												
188	7	DED F22A3	F	N	9.0	Y	+10	+10	13750	68	30.10	54	3	94.0	K	M	2	2650	0.6	92.0	3	3000	2.0	1	0			A	K	2	3400	0.6
													2	95.0	K	M	2	2350	0.6												
													4	90.0	K	M	3	2550	0.8												
256	28	DED F22A3	F	N	9.0	Y	+ 6	+ 6	27163	70	29.38	55	3	94.0	K	M	3	2350	1.5	92.0	3	2050	3.0	1	N	96.3	87.0	B	K	3	2400	1.5
													2	96.0	K	M	3	2500	1.5												
													4	92.0	K	M	3	2200	1.5												
291	46	DED F22A3	F	N	9.0	Y	+ 6	+ 6	15553	76	29.24	80	3	87.0	K	M	3	2350	0.5					1				N				
													2	89.0	K	M	3	2600	0.5												
													4	87.0	K	M	3	2350	0.5												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
														MAXIMUM					PART THROTTLE									RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
325	41	DGD F22A3	C	N	9.0	Y	+ 6	+ 6	10955	68	30.21	66	3	89.0	K	M	2	3200	1.2	F				1			N				
													2	90.0	K	M	2	3200	1.2												
													4	87.0	K	M	2	3200	1.2												
360	8	DGD F22A3	F	N	9.0	Y	+ 6	+ 6	14480	61	29.99	63	3	88.0	K	M	2	3000	0.4					1			N				
													2	88.0	K	M	2	3100	0.4												
													4	87.0	K	M	2	3200	0.4												
359	8	DKC 222A3	F	N	9.0	Y	+14	+10	21900	64	30.28	71	3	92.0	K	M	2	3500	1.0	90.0	3	2500	2.5	1			A	K	2	3500	1.0
													2	94.0	K	M	2	3500	1.0												
													4	88.0	K	M	2	2600	1.0												
424	31	DKC 222A3	F	N	9.0	Y	+10	+10	47025	49	29.22	72	3	88.0	K	M	3	2400	1.8					1							
													2																		
													4																		
38	8	DKD F22A3	F	N	9.0	Y	+ 6	+ 6	16168	78	29.64	40	3	94.0	K	M	3	2000	1.1	F				1			B	K	3	2200	1.1
													2	95.0	K	M	3	2100	1.1												
													4	89.0	K	M	3	1900	1.1												
326	41	DKD F22A3	C	N	9.0	Y	+ 6	+ 6	13007	74	30.07	51	3	93.0	K	M	2	2900	1.0	F				1			A	K	2	2900	1.0
													2	94.0	K	M	2	2900	1.0												
													4	90.0	K	M	2	2900	1.0												
37	8	DKG 226A3	F	N	8.7	Y	+ 7	+ 7	22179	75	30.04	67	3	87.0	K	M	2	2900	1.2	F				1			N				
													2	88.0	K	M	2	2900	1.2												
													4	84.0	K	M	2	2900	1.2												
361	8	DMP 252A3	F	Y	H	8.7	Y	+15	+16	6667	76	29.41	90	3	92.0	K	M	2	2300	1.0					1	N	98.1	87.7	A	K	3	1400	12.0
													2	95.0	K	M	2	2300	1.0												
													4	90.0	K	M	2	2100	1.0												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION							
														MAXIMUM					PART THROTTLE								RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK NK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
362	6	DMP 252A3	F	Y L	8.7	Y	+15	+16	6667	83	29.42	95	3	91.0	K	M	2	2200	1.0				1								
													2	94.0	K	M	2	2300	1.0												
													4	89.0	K	M	2	2000	1.0												
61	8	GD8 F41A4	F	N	8.5	Y	+10	+10	13317	80	29.93	41	3	86.0	K	M	4	1650	1.6	F			1				N				
													2	87.0	K	M	4	1750	1.6												
													4	84.0	K	M	3	1950	1.0												
118	23	GD8 F41A4	F	N	8.5	Y	+10	+10	14106	30	29.35	18	3	93.0	K	M	3	2300	0.8	89.0	4	1600	2.0	1				N	K	3	2200	0.8
													2	94.0	K	M	3	2300	0.8												
													4	90.0	K	M	3	2100	0.8												
119	23	GD8 F41A4	F	N	8.5	Y	+10	+10	13301	51	29.09	40	3	90.0	K	M	3	2000	0.8	89.0	4	1600	2.0	1				N				
													2	93.0	K	M	3	2400	0.8												
													4	89.0	K	M	3	2100	0.8												
161	26	GD8 F41A4	F	N	8.5	Y	+10	+10	8168	91	30.00	124	3	89.0	K	M	4	1550	1.0	89.0	4	1600	2.0	1		92.8	82.6	N				
													2	89.0	K	M	4	1500	1.0												
													4	88.0	K	M	4	1550	1.0												
306	46	GD8 F41A4	F	N	8.5	Y	+10	+10	19950	75	29.45	82	3	86.0	K	M	4	1850	1.5				1				N				
													2	85.5	K	M	4	1900	1.5												
													4	84.0	K	M	4	1850	1.5												
401	6	GD8 F41A4	F	N	8.5	Y	+10	+10	8245	59	30.02	70	3	89.0	K	M	4	1600	0.6	89.0	4	1700	1.6	1	N	92.5	84.0	N				
													2	90.0	K	M	3	2000	1.0												
													4	89.0	K	M	4	1600	0.6												
84	5	GK8 F41A4	F	N	8.5	Y	+10	+10	7206	68	30.45	55	3	87.5	K	M	2	1950	1.5	87.5	4	1800	3.0	1	N	94.8	83.1	N				
													2	88.5	K	M	2	2550	1.5												
													4	87.0	K	M	4	1950	1.8												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION								
													MAXIMUM							PART THROTTLE									RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINTER	NTYPE	GEAR	RPM	MV
120	23	GK8 F41A4	F	N	8.5	Y	+10	+10	9330	61	29.00	66	3	91.0	K	M	2	2100	0.6	87.0	4	1550	2.0	1				B	K	3	2000	0.8
													2	94.0	K	M	2	3500	0.6												
													4	89.0	K	M	2	1900	0.6												
101	23	HAR F25A3	F	N	9.0	Y	+ 8	+ 8	7391	68	28.94	50	3	88.0	K	M	3	2700	1.2	85.0	3	1500	4.0	1				N				
													2	90.0	K	M	3	2700	1.2												
													4	85.0	K	M	3	2900	1.2												
102	23	HAR F25A3	F	N	9.0	Y	+ 8	+ 8	9131	57	29.36	58	3	90.0	K	M	3	2700	0.8	87.0	3	1500	3.0	1				N				
													2	91.0	K	M	3	2800	0.8												
													4	87.0	K	M	3	2400	0.8												
103	23	HAR F25A3	F	N	9.0	Y	+ 8	+ 8	9131	42	29.23	21	3	90.0	K	M	3	2000	1.0	87.0	3	1600	4.0	1				N				
													2	90.0	K	M	3	2400	1.0												
													4	87.0	K	M	3	2100	1.0												
150	28	HAR F25A3	F	N	9.0	Y	+ 8	+ 8	6003	80	29.94	112	3	94.0	K	M	3	1700	1.0	94.0	3	1500	2.0	1		91.4	82.3	B	K	3	1650	1.0
													2	95.0	K	M	3	1650	1.0												
													4	93.0	K	M	3	1400	1.0												
195	7	HAR F25A3	F	N	9.0	Y	+ 8	+ 8	10022	70	30.40	66	3	96.0	K	P	3	1450	7.0	96.0	3	1450	7.0	1				A	K	3	1600	7.0
													2	99.0	K	P	3	1450	7.0												
													4	88.0	K	M	2	2750	1.0												
215	60	HAR F25A3	F	N	9.0	Y	+ 8	+ 8	11354	68	30.30	56	3	91.0	K	M	3	2000	1.5	90.0	3	2000	3.0	1	0	92.5	83.1	A	K	2	3300	1.7
													2	94.0	K	M	3	2900	1.1												
													4	87.0	K	M	3	1900	1.5												
10	29	HAX 228A3	F	N	8.5	Y	+10	+10	13622	70	30.02	62	3	91.0	K	P	3	1400	6.0	91.0	3	1400	6.0	1	N	91.8	83.0	A	K	3	1300	6.0
													2	94.0	K	M	3	2200	1.5												
													4	88.5	K	M	2	2400	1.3												

		VEHICLE DESCRIPTION								WEATHER				OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
														MAXIMUM						PART THROTTLE									RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NO MOT	NINT	NTYPE	GEAR	RPM	MV
196	7	HAX 228A3	F	N	8.5	Y	+10	+10	6574	80	30.30	68	3	92.0	K	M	3	1700	2.1	92.0	3	2100	5.0	1	N	97.5	86.9	N				
													2	94.0	K	P	3	1950	5.0												
													4	87.0	K	M	3	1700	2.1												
297	46	HAX 228A3	F	N	8.5	Y	+ 8	+10	9994	75	29.20	96	3	87.0	K	M	3	2100	2.0	86.0	3	2200	3.0	1				N				
													2	87.0	K	M	3	2100	2.0												
													4	84.0	K	M	3	2000	2.0												
387	6	HBH 450A4	F	N	8.6	Y	+ 6	+ 6	10489	57	29.73	35	3	95.0	K	M	4	1000	0.6	95.0	4	800	2.0	1	N	92.7	82.6	A K 4				
													2	95.0	K	M	4	1000	0.6												
													4	93.0	K	M	4	900	0.6												
388	6	HBH 450A4	F	N	8.6	Y	+ 6	+ 6	10017	67	29.49	62	3	96.0	K	M	2	2500	0.4	94.0	4	1000	1.8	1				N				
													2	96.0	K	M	4	1100	0.6												
													4	93.0	K	M	4	1000	0.6												
336	41	HF1 228A4	C	N	8.5	Y	+10	+10	16875	72	30.02	52	3	94.0	K	M	4	1300	2.2	F				1				A K 4				
													2	95.0	K	M	4	1300	2.2												
													4	92.0	K	M	4	1300	2.2												
74	5	HGA 238A3	F	Y	H	8.0	Y	+15	+15	8334	75	29.93	66	3	85.0	K	M	2	2850	1.2	F				1	N	91.8	83.2	N				
													2	86.0	K	M	2	3000	1.2												
													4	82.0	K	M	3	1850	1.0												
75	5	HGA 238A3	F	Y	L	8.0	Y	+15	+15	8334	75	29.93	66	3	82.0	K	M	2	2600	1.2	F				1								
													2	86.0	K	M	2	3000	1.2												
													4	82.0	K	M	3	1850	1.2												
104	23	HGA 238A3	F	Y	H	8.0	Y	+15	+15	13781	40	29.18	13	3	94.0	K	M	3	1900	1.0	90.0	3	1600	2.0	1				N				
													2	95.0	K	M	3	1800	1.0												
													4	92.0	K	M	3	1900	1.0												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
														MAXIMUM					PART THROTTLE											RATER		
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
105	23	HGA 238A3	F	Y L	8.0	Y	+15	+15	13781	40	29.18	13	3	91.0	K	M	3	1800	1.0	F				1								
													2	92.0	K	M	3	1800	1.0													
													4	89.0	K	M	3	1800	1.0													
12	29	HGH 450A3	F	N	8.6	Y	+ 6	+ 6	6369	70	30.22	62	3	94.0	K	M	3	1600	1.4	93.0	3	1800	3.0	1		92.4	83.1	A	K	3	1400	3.0
													2	96.0	K	M	3	1700	1.4													
													4	92.0	K	M	2	1700	1.1													
151	28	HGH 450A3	F	N	8.6	Y	+ 6	+ 6	7205	75	30.00	77	3	89.0	K	M	3	1700	1.5					1	N	92.8	82.6	N				
													2	89.0	K	M	3	1575	2.0													
													4	87.0	K	M	3	1250	3.0													
389	6	HGH 450A3	F	N	8.6	Y	+ 6	+ 6	6345	68	30.25	65	3	95.0	K	M	2	2300	0.4	91.0	3	1300	3.0	1	N	98.9	88.2	N				
													2	96.0	K	M	2	2500	0.4													
													4	92.0	K	M	2	1850	0.4													
11	29	HGH 450A4	F	N	8.6	Y	+ 6	+ 6	7287	70	30.09	58	3	91.0	K	M	3	1700	1.0	89.0	4	2000	3.5	1	N			N				
													2	94.0	K	M	3	1750	1.0													
													4	88.0	K	M	3	1700	1.0													
13	29	HJO F18A3	F	N	9.0	Y	+ 8	+ 8	19176	70	29.93	61	3	91.0	K	M	2	2800	0.8	90.5	3	1500	8.0	1	N	91.5	83.0	A	K	2	2700	0.8
													2	95.5	K	M	2	2750	0.8													
													4	87.5	K	M	3	2800	0.8													
49	8	HJO F18A3	F	N	9.0	Y	+ 8	+ 8	11533	75	29.84	76	3	87.0	K	M	3	1700	1.5	85.0	3	1500	4.0	1				N				
													2	88.0	K	M	3	1700	1.5													
													4	86.0	K	M	3	1700	1.5													
298	46	HJO F18A3	F	N	9.0	Y	+ 8	+ 8	14089	75	29.30	92	3	83.0	K	M	3	2700	1.0					1				N				
													2	83.0	K	M	3	2600	1.0													
													4	81.0	K	M	3	2500	1.0													

		VEHICLE DESCRIPTION							WEATHER				OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION							
							SPARK ADVANCE						MAXIMUM						PART THROTTLE						RATER						
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
337	41	HJO	F18A3	C	N	9.0	Y	+ 8	+ 8	20585	72	30.07	67	3	93.0	K	P	3	1750	5.0	93.0	3	1750	5.0	1				A	K	3	1750	5.0
														2	91.0	K	M	3	3100	1.2											
														4	88.0	K	M	3	3100	1.2											
390	6	HJO	F18A3	F	N	9.0	Y	+ 8	+ 8	9203	69	29.49	54	3	86.0	K	M	3	2500	0.4	82.0	3	2100	3.0	1	0	94.7	83.6	N				
														2	88.0	K	M	3	2300	0.4											
														4	85.0	K	M	3	2300	0.4											
14	29	HPR	F25A3	F	N	9.0	Y	+ 8	+ 8	7740	70	30.05	60	3	94.0	K	P	3	1300	5.5	94.0	3	1300	5.5	1	Y	92.7	83.5	A	K	3	1300	3.5
														2	99.0	K	P	3	1700	5.5											
														4	89.0	K	M	3	2700	1.4											
108	23	HPR	F25A3	F	N	9.0	Y	+ 8	+ 8	11989	39	29.43	19	3	97.0	K	M	3	1900	3.5	97.0	3	1900	5.0	1				A	K	3	1600	
														2	99.0	K	M	3	1700	3.5											
														4	95.0	K	M	3	2500	1.2											
152	28	HPR	F25A3	F	N	9.0	Y	+ 8	+ 8	16601	89	29.97	102	3	84.0	K	M	2	2450	1.0	F				1		92.1	82.6	N				
														2	84.0	K	M	2	2600	1.0											
														4	82.0	K	M	2	2400	1.0											
315	40	HPR	F25A3	F	N	9.0	N	+ 8	+ 8	7750	61	30.02	67	3	90.5	K	M	3	2700	3.5					1				N				
														2	91.0	K	M	3	2600	3.5											
														4	88.0	K	M	3	2600	3.5											
76	5	HPR	F25M4	F	N	9.0	N	+ 8	+ 8	6078	73	30.40	56	3	91.5	K	M	3	1600	0.2	F				1	N	96.2	85.7	N				
														2	95.5	K	M	3	3250	0.2											
														4	91.0	K	M	4	1200	0.2											
107	23	HPR	F25M4	F	N	9.0		+ 8	+ 8	7616	38	29.21	11	3	91.0	K	M	4	2900	1.0	91.0	4	2900	5.0	1				N				
														2	92.0	K	M	4	2900	1.0											
														4	88.0	K	M	4	1200	1.0											

		VEHICLE DESCRIPTION							WEATHER				OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION								
							SPARK ADVANCE						MAXIMUM					PART THROTTLE										RATER					
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
131	62	HPR F25M4	F	N	9.0	Y	+11	+ 8	13156	68	30.01	60	3	92.0	K	M	4	1900	1.1	90.0	4	1950	2.1	1	N	94.9	86.0	N				
													2	93.0	K	M	4	1900	1.1												
													4	88.0	K	M	4	2150	1.1												
153	26	HPR F25M4	F	N	9.0	Y	+ 8	+ 8	10836	84	30.04	111	3	90.0	K	M	4	2400	0.5	89.0	4	1900	1.5	1	N	98.0	86.4	N				
													2	90.0	K	M	4	2875	0.5												
													4	87.0	K	M	4	1575	0.0												
177	4	HPR F25M4	F	N	9.0	N	+ 9	+91	99910	78	29.30	67	3	90.0	K	M	4	1500	0.2	88.0	4	1500	5.0	1	N	96.9	88.3	N				
													2	91.0	K	M	4	1600	0.2												
													4	88.0	K	M	4	1400	0.2												
197	7	HPR F25M4	F	N	9.0	Y	+ 5	+ 8	18782	70	30.24	61	3	98.0	K	P	4	1600	4.0	98.0	4	1600	4.0	1	N	96.4	86.2	A	K	3	3600	0.7
													2	100.0	K	P	4	2550	4.0												
													4	92.0	K	M	3	2850	0.7												
298	46	HPR F25M4	F	N	9.0	Y	+ 8	+ 8	8886	74	29.56	74	3	87.0	K	M	4	1650	1.5					1				N				
													2	88.0	K	M	4	2500	1.5												
													4	88.0	K	M	4	1900	1.5												
391	6	HPR F25M4	F	N	9.0	Y	+ 8	+ 8	9980	41	29.75	23	3	94.0	K	M	3	3000	0.4	F				1	N			N				
													2	95.0	K	M	3	3100	0.4												
													4	90.0	K	M	4	1800	0.4												
392	6	HPR F25M4	F	N	9.0	Y	+ 8	+ 8	8724	72	29.54	67	3	98.5	K	P	4	2000	4.0	98.5	4	2000	4.0	1	N	93.3	83.2	A	K	4	2700	1.6
													2	100.0	K	P	4	2700	4.0												
													4	92.0	K	M	4	2000	1.3												
50	8	HTC 216A3	F	N	9.0	Y	+ 8	+ 8	7146	75	30.13	82	3	91.0	K	M	3	1900	2.0	90.0	3	1900	4.0	1				B	K	3	2000	2.0
													2	92.0	K	M	3	1900	2.0												
													4	88.0	K	M	3	1900	2.0												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION								
														MAXIMUM					PART THROTTLE												RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
15	29	IAE 230A3	F	N	8.4	Y	+15	+15	6951	70	31.25	62	3	92.0	K	M	3	2200	1.3	F				1	Y	91.9	83.3	A	K	3	1700	1.3
													2	95.0	K	M	3	2100	1.3													
													4	87.0	K	M	2	1900	1.0													
393	6	IAE 230A3	F	N	8.4	Y	+15	+15	11155	68	29.83	32	3	95.0	K	M	2	2600	0.6	F				1	Y	93.7	82.2	A	K	2	2500	0.6
													2	96.0	K	M	3	2550	0.8													
													4	93.0	K	M	3	1650	1.0													
51	8	IAE 230A3	F	Y	H	8.4	Y	+15	+15	16481	75	30.03	76	3	84.0	K	M	3	2100	1.0	F				1				N				
													2	88.0	K	M	3	1450	1.1													
													4	82.0	K	M	3	2150	1.0													
52	8	IAE 230A3	F	Y	L	8.4	Y	+15	+15	16481	75	30.03	76	3	82.0	K	M	3	2350	1.0					1								
													2	84.0	K	M	3	2200	1.0													
													4																				
266	28	IAE 230A3	F	Y	H	8.4	Y	+15	+15	8987	70	29.16	55	3	88.0	K	M	3	2100	1.5	86.0	3	1900	4.0	1				N				
													2	89.0	K	M	3	2100	1.5													
													4	86.0	K	M	3	2000	1.5													
267	28	IAE 230A3	F	Y	L	8.4	Y	+15	+15	8987	70	29.16	55	3	85.0	K	M	3	2000	1.5	85.0	3	1900	4.0	1								
													2	85.0	K	M	3	2000	1.5													
													4	84.0	K	M	3	2100	1.5													
268	28	IAE 230A3	F	Y	H	8.4	Y	+15	+15	9847	70	29.29	50	3	91.0	K	M	3	2300	1.5	89.0	3	2150	3.0	1				A	K	2	2000	1.2
													2	92.0	K	M	3	2600	1.5													
													4	87.0	K	M	3	2150	1.5													
269	28	IAE 230A3	F	Y	L	8.4	Y	+15	+15	9847	70	29.29	50	3	89.0	K	M	3	2200	1.5	88.0	3	2100	3.0	1								
													2	90.0	K	M	3	2500	1.5													
													4	84.0	K	M	3	2150	1.5													

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION							
														MAXIMUM					PART THROTTLE								RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
271	28	IAE 230A3	F	Y H	8.4	Y	+15	+15	9759	70	29.33	55	3	89.0	K	M	3	2000	1.0	86.0	3	1450	4.0	1				N				
													2	90.0	K	M	3	1900	1.0												
													4	87.0	K	M	3	1700	1.0												
272	28	IAE 230A3	F	Y L	8.4	Y	+15	+15	9759	70	29.33	55	3	87.0	K	M	3	1850	1.5	84.0	3	1700	4.0	1								
													2	87.0	K	M	3	1700	1.5												
													4	85.0	K	M	3	1700	1.0												
302	46	IAE 230A3	F	Y H	8.4	Y	+12	+12	8722	76	29.35	90	3	83.0	K	M	2	2550	1.5					1				N				
													2	84.0	K	M	3	2150	1.5												
													4	82.0	K	M	2	2800	1.5												
303	46	IAE 230A3	F	Y L	8.4	Y	+12	+12	8722	76	29.35	90	3	82.0	K	M	3	2050	1.5					1								
													2	84.0	K	M	3	2150	1.5												
													4	81.0	K	M	2	2800	1.5												
434	47	IAE 230A3	C	Y H	8.4	Y	+14	+15	6400	70	29.65	38	3	84.0	K	M	3	2000	0.2	F				1								
													2	88.0	K	M	3	2000	0.2												
													4	82.0	K	M	3	1750	0.2												
435	47	IAE 230A3	C	Y L	8.4	Y	+14	+15	6400	70	29.65	38	3	83.0	K	M	3	2000	0.2					1								
													2	87.0	K	M	3	2000	0.2												
													4	81.0	K	M	3	1750	0.2												
77	5	IAR F25A3	F	N	9.0	Y	+ 8	+ 8	16630	70	30.20	52	3	98.0	K	M	3	1450	2.5	98.0	3	1425	7.0	1								
													2	99.0	K	P	3	1425	7.0												
													4	96.0	K	M	3	1400	2.5												
338	41	IAR F25A3	C	N	9.0	Y	+ 6	+ 6	18333	79	30.02	80	3	92.0	K	M	3	1600	4.0	F				1	Y	93.0	82.9	A	K	3	1600	7.0
													2	93.0	K	M	3	1600	4.0												
													4	89.0	K	M	3	1600	4.0												

		VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
							SPARK ADVANCE						MAXIMUM					PART THROTTLE										RATER		
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWKN K	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
53	8	IBY 450A3	F	N	8.0	Y	+20	+20	8583	80	29.96	45	3	94.0	K	P	3	1500	10.0	94.0	3	1500	10.0	1				B	K	3	1400	10.0
													2	96.0	K	P	3	1500	10.0												
													4	88.0	K	M	3	1950	2.0												
108	23	IBY 450A3	F	N	8.0	Y	+20	+20	8440	61	29.08	51	3	94.0	K	M	2	2000	0.5	91.0	3	1500	4.0	1				B	K	3	2000	1.4
													2	95.0	K	M	2	2000	0.5												
													4	90.0	K	M	2	2000	0.5												
154	28	IBY 450A3	F	N	8.0	Y	+20	+20	15950	81	30.10	93	3	88.0	K	M	2	1800	1.0					1		97.2	86.9	N				
													2	89.0	K	M	2	2100	1.0												
													4	85.0	K	M	2	1850	1.0												
198	7	IBY 450A3	F	N	8.0	Y	+20	+20	6134	70	30.02	66	3	91.0	K	M	3	1950	2.0	88.0	3	1800	3.0	1	N	92.0	82.1	B	K	3	1900	2.0
													2	33.0	K	M	2	1950	1.2												
													4	88.0	K	M	3	1600	1.8												
16	29	IBY 450A4	F	N	8.0	Y	+20	+20	6592	70	31.25	61	3	88.5	K	M	3	1800	1.6	88.5	4	1400	6.0	1	N	92.2	84.0	A	K	4	1400	6.0
													2	91.5	K	M	3	2000	1.6												
													4	86.5	K	M	2	1800	1.2												
17	29	IBY 450A4	F	N	8.0	Y	+20	+20	8311	70	30.09	60	3	92.5	K	M	3	1900	1.4	89.0	4	1700	4.0	1	Y	92.2	83.4	A	K	3	1850	1.4
													2	95.5	K	M	3	1900	1.4												
													4	90.0	K	M	3	1800	1.4												
78	5	IBY 450A4	F	N	8.0	Y	+20	+20	6112	70	30.45	55	3	92.0	K	M	2	2475	1.0	F				1								
													2	93.0	K	M	2	2475	1.0												
													4	90.0	K	M	2	1925	1.0												
109	23	IBY 450A4	F	N	8.0	Y	+20	+20	13894	52	29.23	38	3	91.0	K	M	3	2200	0.9	91.0	4	1100	2.0	1				N				
													2	92.0	K	M	3	2200	0.9												
													4	91.0	K	M	4	1100	1.2												

		VEHICLE DESCRIPTION							WEATHER				OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION							
							SPARK ADVANCE						MAXIMUM					PART THROTTLE								RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
339	41	IBY 450A4	C	N	8.0	Y	+20	+20	6902	70	30.08	26	3	92.5	K	M	4	1150	1.8	F				1	N	97.5	86.4	N				
													2	93.0	K	M	4	1150	1.8													
													4	90.0	K	M	4	1150	1.8													
394	6	IBY 450A4	F	N	8.0	Y	+15	+20	14985	74	29.29	73	3	93.0	K	M	2	2200	0.6	92.0	4	1300	9.0	1				A	K	3	2200	0.6
													2	93.0	K	M	3	2200	0.6													
													4	90.0	K	M	3	2100	0.6													
395	6	IBY 450A4	F	N	8.0	Y	+20	+20	15032	33	30.15	19	3	96.0	K	M	2	1900	0.6	94.0	4	900	6.0	1	0			A	K	3	2000	0.6
													2	96.0	K	M	2	2200	0.6													
													4	93.0	K	M	3	1900	0.6													
436	47	IDY 450A4	C	N	8.0	Y	+20	+20	14800	70	29.95	38	3	92.0	K	M	3	2250	0.2					1								
													2	93.0	K	M	3	2250	0.2													
													4	90.0	K	M	4	1200	1.0													
270	28	IDY 450A4	F	N	8.0	Y	+20	+20	15850	70	29.52	55	3	90.0	K	P	4	1600	4.0	90.0	4	1600	4.0	1	N			B	K	4	2000	2.0
													2	93.0	K	P	4	1600	4.0													
													4	88.0	K	P	4	1600	4.0													
437	47	IDY 450A4	C	N	8.0	Y	+20	+20	14558	70	30.00	58	3	90.5	K	M	4	1300	1.0	90.5	4	1300	3.0	1								
													2	91.0	K	M	4	2200	1.0													
													4	89.5	K	M	4	1200	1.0													
54	8	IGA 238A3	F	N	8.0	Y	+15	+15	16966	75	30.15	45	3	87.0	K	M	3	1450	1.5	F				1				N				
													2	88.0	K	M	3	1800	1.0													
													4	84.0	K	M	3	1800	1.5													
55	8	IGA 238A3	F	N	8.0	Y	+15	+15	6919	76	29.86	61	3	88.0	K	M	2	2100	1.1	F				1				B	K	2	2100	1.1
													2	90.0	K	M	2	2100	1.1													
													4	78.0	K	M	2	2100	1.0													

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION						
								SPARK ADVANCE						MAXIMUM					PART THROTTLE							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
132	62	IGA 238A3	F	N	8.0	Y	+15	+15	11196	67	30.10	54	3	95.0	K	M	3	1900	0.7	95.0	3	1500	8.0	1				A	K	3	1950	0.8
													2	95.0	K	M	3	1900	0.7												
													4	92.0	K	M	3	2050	0.7												
18	29	IGA 238A3	F	Y	H	8.0	Y	+15	+15	7488	70	29.93	61	3	98.5	K	P	3	1400	4.0	98.5	3	1400	4.0	1	0	92.1	83.7	A	K	3	1400	4.0
													2	99.0	K	M	3	1400	1.5												
													4	91.5	K	M	2	1700	1.3												
19	29	IGA 238A3	F	Y	L	8.0	Y	+15	+15	7490	70	29.93	61	3	80.0	K	M	3	1450	1.5					1								
													2	82.0	K	M	3	1450	1.5												
													4																			
155	26	IGA 238A3	F	Y	H	8.0	Y	+15	+15	6025	91	29.94	118	3	90.0	K	M	3	1750	1.0	F				1		91.9	82.5	N				
													2	91.0	K	M	3	1700	1.0												
													4	88.0	K	M	3	1900	1.0												
156	26	IGA 238A3	F	Y	L	8.0	Y	+15	+15	6025	91	29.94	118	3	78.0	K	M	3	1675	1.0					1								
													2	78.0	K	M	2	1500	0.5												
													4	80.0	K	M	2	2250	0.5												
157	26	IGA 238A3	F	Y	H	8.0	Y	+15	+15	10816	82	29.96	114	3	90.0	K	M	3	1625	1.0					1	N	92.3	82.3	N				
													2	90.0	K	M	3	1625	1.0												
													4	87.0	K	M	3	1650	1.0												
158	26	IGA 238A3	F	Y	L	8.00	Y	+15	+15	10816	82	29.96	114	3	80.0	K	M	2	2075	0.5					1								
													2	80.0	K	M	3	1625	1.0												
													4	80.0	K	M	3	1625	1.0												
300	46	IGA 238A3	F	Y	H	8.0	Y	+12	+15	13671	76	29.40	90	3	89.0	K	M	3	2000	1.5					1				N				
													2	91.0	K	M	3	2000	1.5												
													4	87.0	K	M	3	2000	1.5												

OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAX OCT NO	MAX NTYPE	MAX THR	MAX GEAR	MAX RPM	MAX MV	PART THR OCT NO	PART THR GEAR	PART THR RPM	PART THR MV	FUEL	OWNK	RATER OCT RES	RATER OCT MOT	RATER NINT	RATER NTYPE	RATER GEAR	RATER RPM	RATER MV
301	46	IGA 238A3	F	Y	L	8.0	Y	+12	+15	13671	76	29.40	90	3	78.0	K	M	3	2100	1.5					1			N				
														2	78.0	K	M	3	2000	1.5												
														4	78.0	K	M	3	1950	1.5												
396	6	IGA 238A3	F	Y	H	8.0	Y	+15	+15	15572	67	29.82	49	3	101.0	K	M	3	2300	0.8	F				1	N	94.0	83.1	A	K	3	2000	0.8
														2	101.0	K	M	2	2800	1.2												
														4	97.0	K	M	3	2000	0.8												
397	6	IGA 238A3	F	Y	L	8.0	Y	+15	+15	15572	67	29.82	49	3	98.0	K	M	3	2000	0.8	F				1								
														2	101.0	K	M	2	2800	1.2												
														4	97.0	K	M	3	2000	0.8												
79	5	IGY 450A3	F	N		8.0	Y	+20	+20	6125	70	30.05	53	3	91.0	K	P	3	800	5.0	91.0	3	800	5.0	1	N	91.9	82.6	B	K	3	1000	4.0
														2	91.0	K	M	2	1900	1.0												
														4	90.0	K	M	3	925	1.5												
110	23	IJP F20A3	F	N		9.3	Y	+ 6	+ 6	7989	62	29.41	50	3	96.0	K	M	3	2900	0.6	F				1				A	K	3	2800	0.6
														2	97.0	K	M	3	2900	0.6												
														4	93.0	K	M	3	2900	0.6												
20	29	IJO F18A3	F	N		9.0	Y	+ 8	+ 8	8109	70	30.02	62	3	92.0	K	M	3	2250	1.0	90.0	3	2000	2.5	1		92.6	83.9	N				
														2	95.0	K	M	3	2250	1.0												
														4	88.0	K	M	3	2200	1.0												
199	7	IJO F18A3	F	N		9.0	Y	+ 8	+ 8	10010	70	30.30	61	3	92.0	K	M	3	2250	0.8	89.0	3	1700	6.0	1	Y	93.0	83.2	B	K	2	4050	1.0
														2	95.0	K	M	3	2450	0.8												
														4	90.0	K	M	3	2500	0.8												
21	29	IXR F25A3	F	N		9.0	Y	+ 8	+ 8	8316	70	30.22	60	3	92.0	K	M	3	2200	1.5	90.0	3	2000	2.5	1	N	92.3	83.3	B	K	3	2300	1.5
														2	94.0	K	M	3	2250	1.5												
														4	88.0	K	M	3	2150	1.5												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
														MAXIMUM					PART THROTTLE										RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK NK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
90	5	JA 318A4	F	N	8.8	Y	+18	+18	11085	74	30.18	68	3	87.0	K	M	2	3900	1.4	F			1	N	93.0	84.0	N				
													2	89.0	K	M	2	3900	1.4												
													4	86.0	K	M	2	3900	1.4												
29	29	JA 318M5	F	N	8.8	N	+22	+22	7840	70	30.03	60	3	89.5	K	M	3	600	0.8	86.5	4	1300	1.4	1	N			N				
													2	89.5	K	M	3	600	0.8												
													4	89.5	K	M	3	800	0.8												
91	5	JA 318M5	F	N	8.8	Y	+22	+22	6336	73	30.27	56	3	88.0	K	M	4	2200	1.2	F			1	N	92.2	82.6	N				
													2	88.5	K	M	4	2000	1.2												
													4	88.5	K	M	3	1250	1.2												
208	7	JA 318M5	F	N	8.8	N	+22	+22	22460	70	30.20	56	3	84.0	K	M	4	2100	1.1	80.0	4	2100	2.1	1	N	92.6	82.7	N				
													2	87.0	K	M	3	2700	1.4												
													4	83.0	K	M	4	2200	1.1												
64	5	KEC 222A3	F	N	9.0	Y	+10	+10	10425	73	30.15	60	3	89.0	K	M	2	3500	1.2	F			1	N	97.8	84.6	N				
													2	92.0	K	M	3	2050	5.0												
													4	87.0	K	M	3	3650	1.2												
185	7	KEC 222A3	F	N	9.0	Y	+21	+10	8833	71	30.09	58	3	90.0	K	M	3	2600	1.0	90.0	3	2500	3.0	1	N	92.7	81.7	B	K	3	2600	1.0
													2	91.0	K	M	3	2600	1.0												
													4	87.0	K	M	3	2600	1.0												
1	29	KED F22A3	F	N	9.0	Y	+ 6	+ 6	13241	75	30.03	64	3	92.5	K	M	3	2200	1.2	91.0	3	1650	4.0	1	Y	91.7	83.0	A	K	3	1900	1.2
													2	95.0	K	P	3	1650	4.0												
													4	90.5	K	M	3	2700	1.0												
2	29	KED F22A3	F	N	9.0	Y	+ 6	+ 6	17046	70	30.25	57	3	91.0	K	M	2	2100	0.8	F			1	N	92.0	82.8	N				
													2	91.0	K	M	2	2300	0.8												
													4	91.0	K	M	2	1900	0.8												

OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAX OCT NO	MAX NTYPE	MAX THR	MAX GEAR	MAX RPM	MAX MV	PART THR OCT NO	PART THR GEAR	PART THR RPM	PART THR MV	FUEL	OWNK	OCT RES	OCT MOT	RATER NINT	RATER NTYPE	RATER GEAR	RATER RPM	RATER MV
125	82	KED F22A3	F	N	9.0	Y	+ 6	+ 6	8323	68	30.20	48	3	92.0	K	M	3	2600	0.6	90.0	3	2100	1.7	1	N	92.0	83.0	A	K	2	3100	0.5
													2	94.0	K	M	3	2400	0.6													
													4	90.0	K	M	2	2400	0.5													
186	7	KED F22A3	F	N	9.0	Y	+ 6	+ 6	6879	70	30.40	56	3	90.0	K	M	2	3400	0.6	F				1				N				
													2	92.0	K	M	2	3500	0.6													
													4	86.0	K	M	2	2550	0.6													
211	60	KED F22A3	F	N	9.0	Y	+ 8	+ 6	19794	68	30.10	48	3	93.0	K	M	2	2500	0.5	92.0	3	2200	2.0	1	N	92.1	83.2	A	K	2	3000	0.5
													2	95.0	K	M	3	2650	0.8													
													4	91.0	K	M	3	2200	0.8													
253	28	KED F22A3	F	N	9.0	Y	+ 6	+ 6	14859	70	29.39	35	3	87.0	K	M	2	2800	0.5	86.0	3	2300	3.0	1				A	K	2	2900	0.5
													2	89.0	K	M	2	2900	0.5													
													4	87.0	K	M	2	2200	0.5													
322	41	KED F22A3	C	N	9.0	Y	+ 6	+ 6	7831	67	30.10	66	3	89.0	K	M	2	3200	0.8	F				1				N				
													2	89.0	K	M	2	3200	0.8													
													4	86.0	K	M	2	3200	0.8													
356	6	KED F22A3	F	N	9.0	Y	+ 6	+ 6	6055	64	29.98	76	3	94.0	K	P	3	1700	7.0	94.0	3	1700	7.0	1	N	93.6	83.1	B	K	3	2200	0.8
													2	94.0	K	M	2	2400	0.8													
													4	91.0	K	M	3	2100	0.8													
254	28	KEE TF22A3	F	Y	H	8.1	Y	+12	+12	16097	70	29.34	55	3	91.0	K	M	3	2300	2.0	90.0	3	2000	5.0	1				N				
													2	92.0	K	M	3	2300	2.0													
													4	89.0	K	M	3	2500	2.0													
255	28	KEE TF22A3	F	Y	L	8.1	Y	+12	+12	16097	70	29.34	55	3	88.0	K	M	3	2300	2.0	87.0	3	2200	5.0	1								
													2	89.0	K	M	3	2300	2.0													
													4	85.0	K	M	3	2400	2.0													

		VEHICLE DESCRIPTION									WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
															MAXIMUM					PART THROTTLE										RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK NK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
309	40	KEE TF22A3	F	Y	H 8.1	N	+12	+12	9686	38	29.70	20	3	90.0	K	M	2	2000	- 6	88.0	3	2800	- 3	1				N				
													2	90.0	K	M	3	2600	- 6												
													4	90.0	K	M	3	2400	- 6												
310	40	KEE TF22A3	F	Y	L 8.1	N	+12	+12	9686	38	29.70	20	3	88.0	K	M	3	2200	- 2					1								
													2	89.0	K	M	3	2600	- 6												
													4	88.0	K	M	3	2200	- 2												
422	31	KGD F22A3	F	N	9.0	Y	+ 4	+ 4	6080	27	28.85	93	3	86.0	K	M	2	5000	2.1					1								
													2																			
													4																			
137	26	KGE TF22A3	F	Y	H 8.1	Y	+18	+12	10673	70	30.00	80	3	90.0	K	M	3	3025	- 6					1		96.4	85.8	N				
													2	90.0	K	M	3	3025	- 6												
													4	90.0	K	M	3	2875	- 6												
138	26	KGE TF22A3	F	Y	L 8.1	Y	+18	+12	10673	70	30.00	80	3	85.0	K	M	3	2675	- 6					1								
													2	85.0	K	M	3	2925	- 6												
													4	85.0	K	M	3	2725	- 6												
3	29	KKC 222A3	F	N	9.0	Y	+10	+10	18747	70	30.15	58	3	88.5	K	M	2	2300	1.9	F				1		91.9	83.6	B	K	2	2300	1.9
													2	90.5	K	M	2	2300	1.9												
													4	87.0	K	M	2	2300	1.9												
65	5	KKC 222A3	F	N	9.0	N	+10	+10	6004	70	30.10	52	3	89.0	K	M	2	2900	1.5	86.0	3	2650	6.5	1	N	91.9	82.5	B	K	2	2850	1.5
													2	91.0	K	M	2	2900	1.5												
													4	87.0	K	M	2	2750	1.5												
324	41	KKC 222A3	F	N	9.0	Y	+10	+10	16380	66	30.30	68	3	89.0	K	M	2	2900	1.8	F				1				B	K	2	2900	1.8
													2	91.0	K	M	2	2900	1.8												
													4	87.0	K	M	2	2900	1.8												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION							
							SPARK ADVANCE							MAXIMUM						PART THROTTLE							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	MTHR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	NINT	OCT RES	NO MOT	NTYPE	GEAR	RPM	MV
357	6	KKC 222A3	F	N	9.0	Y	+14	+10	14535	79	29.38	113	3	90.0	K	M	3	2600	1.2	89.0	3	2500	2.2	1		N						
													2	92.0	K	M	2	3600	1.0												
													4	88.0	K	M	2	2400	1.0												
187	7	KKG 226A3	F	N	8.7	Y	+ 7	+ 7	6872	68	30.10	56	3	92.0	K	M	3	2500	2.0	91.0	3	2200	3.0	1	N	91.9	82.9	N				
													2	93.0	K	M	3	2300	2.0												
													4	90.0	K	M	3	2450	2.0												
423	31	KKG 226A3	F	N	8.7	Y	+12	+12	9300	42	28.92	65	3	89.0	K	M	3	3800	1.9					1								
													2																			
													4																			
323	41	KLC 222A3	C	N	9.0	N	+10	+10	13455	72	29.92	76	3	92.0	K	M	2	2900	1.5	F				1	N	92.8	83.1	B	K	2	2900	1.5
													2	93.0	K	M	2	2900	1.5												
													4	90.0	K	M	2	2900	1.5												
358	6	KLC 222A3	F	N	9.0	Y	+10	+10	14672	67	30.09	54	3	92.0	K	M	3	2600	0.8	91.0	3	2500	2.0	1				A	K	3	2500	0.8
													2	94.0	K	M	2	3500	0.4												
													4	88.0	K	M	3	2600	0.8												
139	26	KMP 252A3	F	Y	H	8.7	Y	+16	+16	10388	83	30.00	131	3	96.0	K	M	3	1550	1.0	95.0	3	1500	5.0	1		91.4	82.3	B	K	3	1600	1.0
													2	97.0	K	M	3	1450	1.0												
													4	93.0	K	M	3	1450	1.0												
140	26	KMP 252A3	F	Y	L	8.7	Y	+16	+16	10388	83	30.00	131	3	91.0	K	M	3	1550	1.0					1								
													2	92.0	K	M	3	1450	1.0												
													4	91.0	K	M	3	1550	1.0												
22	29	LAE 230A3	F	N		8.4	Y	+15	+15	19805	70	30.15	57	3	95.0	K	M	3	2250	1.2	F				1		92.4	83.4	A	K	3	2200	1.2
													2	96.0	K	M	2	2200	1.1												
													4	89.0	K	M	3	2100	1.2												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION								
														MAXIMUM					PART THROTTLE											RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
200	7	LAE 230A3	F	N	8.4	Y	+15	+15	7150	65	30.42	60	3	93.0	K	M	2	2500	0.9	92.0	3	2100	2.3	1	N			A	K	2	2850	0.9
													2	96.0	K	M	2	2450	0.9												
													4	90.0	K	M	3	2100	0.5												
438	47	LAE 230A3	C	N	8.4	Y	+15	+15	11000	70	30.14	50	3	86.0	K	M	3	2000	0.5					1								
													2	86.0	K	M	3	2000	0.5												
													4	84.0	K	M	2	2500	0.3												
59	8	LAE 230A3	F	Y H	8.4	Y	+15	+15	25323	80	29.86	74	3	82.0	K	M	3	2400	1.3	F				1				N				
													2	82.0	K	M	3	2400	1.3												
													4	78.0	K	M	3	2300	1.3												
60	8	LAE 230A3	F	Y L	8.4	Y	+15	+15	25323	80	29.86	74	3	78.0	K	M	3	1700	2.3					1								
													2	80.0	K	M	3	2600	1.3												
													4																			
80	5	LAE 230A3	F	Y H	8.4	Y	+15	+15	8954	70	30.15	55	3	90.0	K	M	2	1900	1.0	F				1	N	91.8	82.8	B	K	2	2150	1.0
													2	92.0	K	M	2	2600	1.0												
													4	88.0	K	M	2	2650	1.0												
81	5	LAE 230A3	F	Y L	8.4	Y	+15	+15	8954	70	30.15	55	3	88.0	K	M	3	2450	1.5	F				1								
													2	91.0	K	M	2	2500	1.0												
													4	85.0	K	M	2	2350	1.0												
82	5	LAE 230A3	F	Y H	8.4	Y	+15	+15	8208	74	30.40	63	3	87.5	K	M	3	1700	1.2	F				1	N	91.6	81.7	N				
													2	88.0	K	M	3	1600	1.2												
													4	84.0	K	M	3	1700	1.2												
83	5	LAE 230A3	F	Y L	8.4	Y	+15	+15	8208	74	30.40	63	3	87.5	K	M	3	1700	1.2					1								
													2	88.0	K	M	3	1600	1.2												
													4	84.0	K	M	3	1700	1.2												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION							
							SPARK ADVANCE							MAXIMUM					PART THROTTLE							RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
111	23	LAE 230A3	F	Y	H 8.4	Y	+ 5	+15	10174	52	29.12	25	3	92.0	K	M	3 2200	1.0	F				1				B	K	3 2300	1.0
													2	94.0	K	M	3 2400	1.0												
													4	91.0	K	M	3 2500	1.0												
112	23	LAE 230A3	F	Y	L 8.4	Y	+ 5	+15	10174	52	29.12	25	3	89.0	K	M	3 2500	1.0	85.0	3	1600	2.0	1								
													2	90.0	K	M	3 2500	1.0												
													4	88.0	K	M	3 2500	1.0												
273	28	LAE 230A3	F	Y	H 8.4	Y	+15	+15	17819	70	29.36	50	3	90.0	K	M	3 2450	1.5	87.0	3	2100	3.0	1				N				
													2	91.0	K	M	3 2450	1.5												
													4	87.0	K	M	3 2500	1.5												
274	28	LAE 230A3	F	Y	L 8.4	Y	+15	+15	17619	70	29.36	50	3	88.0	K	M	3 2500	1.5	87.0	3	2100	3.0	1								
													2	88.0	K	M	3 2400	1.5												
													4	86.0	K	M	3 2400	1.5												
275	28	LAE 230A3	F	Y	H 8.4	Y	+15	+15	16235	70	29.38	55	3	88.0	K	M	3 2200	1.5	87.0	3	1950	3.0	1				B	K	3 2100	1.5
													2	89.0	K	M	3 1700	1.5												
													4	86.0	K	M	3 1850	1.5												
276	28	LAE 230A3	F	Y	L 8.4	Y	+15	+15	16235	70	29.38	55	3	85.0	K	M	3 2100	1.5	84.0	3	2000	3.0	1								
													2	86.0	K	M	3 1750	1.5												
													4	85.0	K	M	3 1800	1.5												
277	28	LAE 230A3	F	Y	H 8.4	Y	+15	+15	12694	70	29.24	38	3	90.0	K	M	2 2350	1.5	F				1				N				
													2	91.0	K	M	2 2350	1.5												
													4	89.0	K	M	2 2400	1.5												
278	28	LAE 230A3	F	Y	L 8.4	Y	+15	+15	12694	70	29.24	38	3	88.0	K	M	2 2250	1.5					1								
													2	90.0	K	M	2 2300	1.5												
													4	86.0	K	M	2 2300	1.5												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION					
														MAXIMUM					PART THROTTLE						RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWKN K	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
340	41	LAE 230A3	C	Y H	8.4	Y	+15	+15	14262	66	30.04	63	3	94.0	K	M	2	2700	0.8	F				1			B	K	2	2700	0.8
													2	95.0	K	M	2	2700	0.8											
													4	92.0	K	M	2	2700	0.8											
341	41	LAE 230A3	C	Y L	8.4	Y	+15	+15	14262	66	30.04	63	3	86.0	K	M	2	2700	0.8	F				1							
													2	86.0	K	M	2	2700	0.8											
													4	85.0	K	M	2	2700	0.8											
159	26	LAR F25A3	F	N	9.0	Y	+ 8	+ 8	21112	89	29.88	127	3	92.0	K	M	3	1750	1.5					1		92.2 82.3	B	K	3	2400	1.5
													2	92.0	K	M	3	1750	1.5											
													4	91.0	K	M	3	1675	1.5											
342	41	LAR F25A3	C	N	9.0	Y	+ 8	+ 8	17177	68	30.21	66	3	95.0	K	P	3	1700	4.0	95.0	3	1700	4.0	1			A	K	3	1700	4.0
													2	92.0	K	M	2	2900	1.2											
													4	91.0	K	M	2	2900	1.2											
23	29	LBY 450A3	F	N	8.0	Y	+20	+20	18949	70	30.27	58	3	90.0	K	M	2	1700	0.8	87.0	3	1300	6.0	1		92.2 83.4	B	K	2	1600	0.8
													2	92.0	K	M	2	2000	0.8											
													4	86.5	K	M	2	2000	0.8											
304	46	LBY 450A3	F	N	8.0	Y	+25	+20	6263	73	29.48	80	3	86.5	K	M	3	2200	1.5					1			N				
													2	87.0	K	M	3	2200	1.5											
													4	86.0	K	M	3	2150	1.5											
58	8	LBY 450A4	F	N	8.0	Y	+20	+20	6724	84	29.88	58	3	89.0	K	M	2	2200	0.5	87.0	4	1500	5.0	1			B	K	2	2200	0.5
													2	90.0	K	M	2	2200	0.5											
													4	88.0	K	M	2	2100	0.5											
113	23	LBY 450A4	F	N	8.0	Y	+20	+20	10768	87	29.00	94	3	88.0	K	M	3	2000	0.8	88.0	4	1100	2.0	1			N				
													2	89.0	K	M	3	2000	0.8											
													4	87.0	K	M	3	2000	0.8											

OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAX OCT NO	MAX NTYPE	MAX THR	MAX GEAR	MAX RPM	MAX MV	PART THR OCT NO	PART THR GEAR	PART THR RPM	PART THR MV	TANK FUEL	OWNK	RATER OCT RES	RATER OCT MOT	RATER NINT	RATER NTYPE	RATER GEAR	RATER RPM	RATER MV
114	23	LDY 450A4	F	N	8.0	Y	+20	+20	13820	74	28.79	46	3	91.0	K	M	3	2100	0.6	90.0	4	1200	2.0	1				N				
													2	92.0	K	M	3	2100	0.6													
													4	88.0	K	M	3	2000	0.6													
201	7	LDY 450A4	F	N	8.0	Y	+20	+20	19764	65	30.31	60	3	94.0	K	M	2	1950	0.8	92.0	4	1750	8.0	1	Y	92.0	82.0	A	K	3	2150	1.0
													2	95.0	K	M	3	1950	1.0													
													4	90.0	K	M	2	1950	0.8													
160	26	LEY 450A4	F	N	8.0	Y	+20	+20	8537	78	30.06	121	3	89.0	K	M	2	825	1.0					1		97.2	85.8	N				
													2	90.0	K	M	2	825	1.0													
													4	87.0	K	M	3	1750	1.3													
24	29	LGA 238A3	F	Y	H	8.0	Y	+15	+15	7865	70	29.97	59	3	93.0	K	M	2	1550	1.0	F				1	N	92.8	84.0	B	K	3	1500	1.2
													2	93.0	K	M	2	1600	1.0													
													4	91.0	K	M	2	1600	1.0													
25	29	LGA 238A3	F	Y	L	8.0	Y	+15	+15	7904	70	29.97	59	3	78.0	K		2	1500	1.0					1								
													2	78.0	K		2	1500	1.0													
													4																				
115	23	LGA 238A3	F	Y	H	8.0	Y	+15	+15	8079	43	29.23	11	3	91.0	K	M	3	1900	0.8	88.0	3	1600	3.0	1				B	K	2	2500	0.8
													2	93.0	K	M	3	2000	0.8													
													4	90.0	K	M	3	1900	0.8													
116	23	LGA 238A3	F	Y	L	8.0	Y	+15	+15	8079	43	29.23	11	3	88.0	K	M	3	1900	0.8	84.0	3	1600	3.0	1								
													2	89.0	K	M	3	1900	0.8													
													4	87.0	K	M	3	1900	0.8													
279	28	LGA 238A3	F	Y	H	8.0	Y	+15	+15	19672	70	29.37	55	3	87.0	K	M	3	1900	1.5	85.0	3	1850	3.0	1				B	K	3	1900	2.0
													2	87.0	K	M	3	1800	1.5													
													4	85.0	K	M	3	1700	1.5													

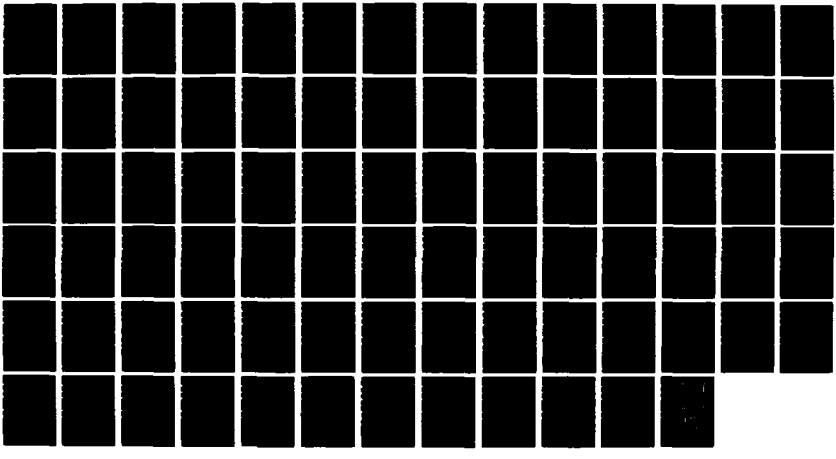
		VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION					
							SPARK ADVANCE						MAXIMUM					PART THROTTLE						RATER		
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	RCD	TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
280	28	LGA 238A3	F	Y	L 8.0	Y	+15	+15	19672	70	29.37	55	3	84.0	K	M	3	1900	1.5	84.0	3	1800	3.0	1							
													2	84.0	K	M	3	1800	1.5											
													4	82.0	K	M	3	1700	1.5											
398	6	LGA 238A3	F	Y	H 8.0	Y	+15	+15	16997	60	30.29	49	3	94.0	K	M	3	1800	0.8	F				1			B	K	3	1800	0.6
													2	96.0	K	M	2	1800	0.6											
													4	92.0	K	M	2	1900	0.6											
399	6	LGA 238A3	F	Y	L 8.0	Y	+15	+15	17126	68	30.12	52	3	91.0	K	M	3	1800	0.8	F				1							
													2	92.0	K	M	2	1800	0.6											
													4	91.0	K	M	2	1800	0.6											
56	8	LG9 TF38A4	F	Y	H 8.0	Y	+22	+22	8371	90	29.75	125	3	92.0	K	M	3	2500	2.2	F				1			B	K	3	2550	2.2
													2	94.0	K	M	3	2500	2.2											
													4	92.0	K	M	3	2500	2.2											
57	8	LG9 TF38A4	F	Y	L 8.0	Y	+22	+22	8371	90	29.75	125	3	88.0	K	M	3	2800	2.2					1							
													2	89.0	K	M	3	2500	2.2											
													4																		
316	40	LG9 TF38A4	C	Y	H 8.0	Y			9850	51	30.19	38	3	96.0	K	M	2	2500	-10	F				1			B	K	2	2600	-12
													2	96.0	K	M	2	2500	-12											
													4	96.0	K	M	2	2900	-10											
317	40	LG9 TF38A4	C	Y	L 8.0	Y			9850	51	30.19	38	3	91.0	K	M	2	2750	-12	F				1							
													2	92.0	K	M	2	2800	-12											
													4	95.0	K	M	2	2750	- 8											
439	47	LG9 TF38A4	C	Y	H 8.0	Y			12200	70	29.82	55	3	96.0	K	M	4	2200	-10					1							
													2	96.0	K	M	4	2400	-10											
													4	95.5	K	M	4	3000	-10											

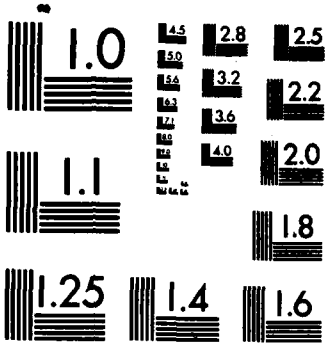
		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					PART THROTTLE									RATER						
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
440	47	LG9 TF38A4	C	Y L	8.0	Y			12200	70	29.82	55	3	94.5	K	M	4	2200	-10				1								
													2	94.5	K	M	4	2200	-10												
													4	94.5	K	M	3	2400	-10												
117	23	LJP F20A3	F	N	9.3	Y	+ 6	+ 6	12189	65	29.20	26	3	95.0	K	M	3	3000	0.6	F			1				B	K	3	3000	0.6
													2	96.0	K	M	3	3000	0.6												
													4	91.0	K	M	3	3000	0.6												
202	7	LJP F20A3	F	N	9.3	Y	+ 6	+ 6	10516	65	30.25	56	3	94.0	K	M	3	3050	0.8	92.0	3	2150	2.0	1	N	92.7	81.9	A	K	2	3600	0.7
													2	97.0	K	M	3	3050	0.8												
													4	91.0	K	M	3	3000	0.8												
305	46	LJP F20A3	F	N	9.3	Y	+ 6	+ 6	6115	75	29.50	92	3	87.0	K	M	3	2900	1.0				1				N				
													2	87.0	K	M	3	2600	1.0												
													4	86.5	K	M	3	2800	1.0												
400	6	LJP F20A3	F	N	9.3	Y	+ 6	+ 6	23775	64	30.14	46	3	94.0	K	M	3	2900	0.6	91.0	3	2500	1.6	1								
													2	95.0	K	M	3	3000	0.6												
													4	91.0	K	M	3	2800	0.6												
203	7	LJO F18A3	F	N	9.0	Y	+ 9	+ 8	11859	68	30.12	48	3	97.0	K	M	3	2400	0.8	96.0	3	1450	5.0	1	N	92.2	83.0	A	K	2	3500	0.4
													2	97.0	K	M	2	3200	0.4												
													4	92.0	K	M	3	3150	0.7												
343	41	LJO F18A3	C	N	9.0	Y	+10	+10	6735	75	30.03	81	3	89.0	K	M	2	3200	0.8	F			1	N	92.7	83.0	N				
													2	90.5	K	M	2	3200	0.8												
													4	88.0	K	M	2	3200	0.8												
281	28	LXR F25A3	F	N	9.0	Y	+ 8	+ 8	15343	70	29.24	45	3	97.0	K	P	3	1350	5.0	97.0	3	1350	5.0	1				A	K	3	1350	5.0
													2	98.0	K	P	3	1350	5.0												
													4	89.0	K	M	2	1850	1.2												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION									
														MAXIMUM					PART THROTTLE											RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
234	32	MA4 216A3	F	N	9.0	Y	+ 8	+14	12904	85	29.33	66	3	92.0	K	M	3	2100	1.5	92.0	3	1500	4.0	1								
													2	94.0	K	M	3	2000	1.5												
													4	92.0	K	M	3	1600	1.5												
235	32	MBA 123A3	F	N	9.0	Y	+10	+10	13434	85	29.54	66	3	96.0	K	M	3	3100	1.3	F				1	N	91.4	82.2	A	K	3	3100	1.4
													2	97.0	K	M	3	3100	1.3												
													4	92.0	K	M	3	2800	1.3												
40	8	MCR 123A3	F	N	9.0	Y	+ 5	+ 5	26402	80	29.93	37	3	98.0	K	M	3	1850	1.0	F				1				B	K	3	1600	4.0
													2	100.0	K	M	2	3000	1.0												
													4	92.0	K	M	3	1700	1.5												
174	4	MCR 123A3	F	N	9.0	N	+15	+15	6533	83	29.17	84	3	80.0	K	M	3	2100	1.5	78.0	3	1550	2.0	1	N	91.5	83.7	N				
													2	80.0	K	M	2	2600	1.0												
													4	78.0	K	M	2	2150	1.0												
236	32	MCR 123A3	F	N	9.0	Y	+ 8	+10	9868	85	29.41	66	3	92.0	K	M	3	3400	1.0	90.0	3	2900	2.0	1	N	90.6	82.8	B	K	3	2950	1.0
													2	92.0	K	M	3	2900	1.0												
													4	91.0	K	M	3	1450	2.2												
237	32	MCR 123A3	F	N	9.0	Y	+15	+15	16655	85	29.65	66	3	90.0	K	M	2	3300	1.0	88.0	3	1400	4.0	1	N	90.8	82.2	N				
													2	90.0	K	M	2	3000	1.0												
													4	90.0	K	M	2	2800	0.8												
238	32	MCR 123A3	F	N	9.0	Y	+10	+10	6966	85	29.33	68	3	92.0	K	M	2	3000	1.4	92.0	3	1250	4.0	1	N	91.0	82.5	N				
													2	90.0	K	M	2	3100	1.4												
													4	90.0	K	M	3	2000	1.2												
294	46	MCR 123M5	F	N	9.0	Y	+15	+15	29277	80	29.60	94	3	83.0	K	M	4	1900	0.5					1				N				
													2	83.0	K	M	4	2050	0.5												
													4	83.0	K	M	4	1700	0.5												

AD-A164 454 1984 CRC (COORDINATING RESEARCH COUNCIL) OCTANE NUMBER 1/1
REQUIREMENT SURVEY(U) COORDINATING RESEARCH COUNCIL INC
ATLANTA GA DEC 85 CRC-544

UNCLASSIFIED F/G 21/4 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION							
							SPARK ADVANCE							MAXIMUM					PART THROTTLE									RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	NO MOT	NINT	NTYPE	GEAR	RPM	MV
239	32	MD3	F38A3	F	N	8.7	Y	+10	+10	12076	85	29.52	62	3	91.0	K	P	3	1950	3.0	91.0	3	1950	3.0	1	N	93.3	83.2	N				
														2	93.0	K	P	3	2300	3.0												
														4	89.0	K	M	2	2000	0.2												
240	32	ME3	F38A3	F	N	8.7	Y	+10	+12	9928	85	29.68	64	3	92.0	K	M	3	2400	1.5	F				1	N	91.5	82.0	B	K	3	1800	1.0
														2	93.0	K	M	2	1800	1.0												
														4	92.0	K	M	3	2300	1.5												
331	41	ME3	F38A3	C	N	8.7	Y	+10	+10	23253	70	30.26	60	3	90.0	K	M	2	2800	0.8	F				1				B	K	2	2800	0.8
														2	91.0	K	M	2	2800	0.8												
														4	89.0	K	M	2	2800	0.8												
241	32	ME3	F38A4	F	N	8.7	Y	+ 8	+10	16409	84	29.33	63	3	91.0	K	M	3	1200	1.2	89.0	4	1350	2.5	1	0	90.3	82.4	B	K	3	1200	1.2
														2	91.0	K	M	3	1200	1.2												
														4	91.0	K	M	3	1200	1.2												
242	32	ME3	F38A4	F	N	8.7	Y	+10	+10	7223	85	29.67	63	3	91.0	K	M	4	1300	2.4	88.0	4	1250	4.0	1	Y	90.0	82.6	B	K	4	1200	2.4
														2	90.0	K	M	4	1300	2.4												
														4	90.0	K	M	4	1250	2.4												
243	32	ME3	F38A4	F	N	8.7	Y	+10	+10	7332	85	29.76	66	3	89.0	K	M	4	1850	1.5	87.0	4	1250	4.0	1	N	90.8	82.2	N				
														2	90.0	K	M	4	1850	1.5												
														4	88.0	K	M	4	1900	1.5												
69	5	MFF	F50A4	F	N	8.4	Y	+10	+10	11111	70	30.20	52	3	91.0	K	M	3	1450	1.5	89.0	4	1375	3.0	1	Y	92.0	83.0	N				
														2	92.0	K	M	3	1475	1.5												
														4	91.0	K	M	3	1550	1.5												
374	6	MFF	F50A4	F	N	8.4	Y	+10	+10	14400	68	29.91	96	3	89.0	K	M	4	1300	0.4	88.0	4	1200	4.0	1								
														2	90.0	K	M	2	2300	0.4												
														4	90.0	K	M	4	1300	0.4												

		VEHICLE DESCRIPTION							WEATHER				OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION							
														MAXIMUM					PART THROTTLE						RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
375	6	MFF F50A4	F	N	8.4	Y	+10	+10	11572	45	30.30	23	3	89.0	K	M	4	1000	2.5	88.0	4	1400	4.0	1							
													2	88.0	K	M	4	1000	2.5											
													4	89.0	K	M	3	1300	1.2											
41	8	NAR F25A3	F	N	9.0	Y	+ 8	+ 8	8475	75	30.20	49	3	91.0	K	M	3	1550	1.8	89.0	3	1550	3.0	1				B	K	3	1550	2.0
													2	92.0	K	M	3	2550	1.5											
													4	88.0	K	M	3	1600	1.8											
377	6	NAR F25A3	F	N	9.0	Y	+ 8	+ 8	9284	68	29.93	98	3	93.0	K	P	3	1500	4.0	93.0	3	1500	4.0	1	Y	93.1	83.0	A	K	3	2700	1.0
													2	96.0	K	P	3	1500	4.0											
													4	90.0	K	M	3	2400	1.0											
42	8	NAX 228A3	F	N	8.5	Y	+10	+10	11592	80	29.66	99	3	92.0	K	M	3	1600	2.5	91.0	3	1450	5.0	1				B	K	3	1900	3.5
													2	94.0	K	M	3	1950	3.5											
													4	88.0	K	M	3	1400	2.5											
70	5	NAX 228A3	F	N	8.5	Y	+10	+10	10645	70	30.35	52	3	95.0	K	P	3	1125	4.5	95.0	3	1125	4.5	1	N	91.9	82.8	A	K	3	1550	2.0
													2	96.0	K	P	3	1175	4.5											
													4	94.0	K	M	3	1075	1.5											
93	23	NAX 228A3	F	N	8.5	Y	+10	+10	8912	62	29.11	30	3	93.0	K	P	3	1600	4.0	93.0	3	1600	4.0	1				B	K	3	1500	4.0
													2	94.0	K	P	3	2000	4.0											
													4	91.0	K	M	3	1600	2.0											
192	7	NAX 228A3	F	N	8.5	N	+10	+10	13923	74	30.40	68	3	87.0	K	M	2	2850	0.7	83.0	3	2600	3.7	1				N				
													2	90.0	K	M	2	2950	0.7											
													4	84.0	K	M	2	2850	0.7											
251	44	NAX 228A3	F	N	8.5	Y	+11	+11	28059	70	30.13	22	3	90.0	K	M	3	2100	1.6	90.0	3	2000	3.6	1				N				
													2	93.0	K	M	3	2000	1.6											
													4	85.0	K	M	3	2100	1.6											

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
							SPARK ADVANCE							MAXIMUM					PART THROTTLE							RATER						
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK NK	OCT RES	NO MOT	NINT	NTYPE	NGEAR	RPM	MV
312	40	NAX 228A3	F	N	8.5	Y	+10	+10	17022	56	30.01	50	3	93.0	K	P	3	1600	4.0	93.0	3	1600	4.0	1				A	K	3	1900	4.0
													2	93.0	K	P	3	2000	4.0												
													4	90.5	K	M	3	1800	1.0												
333	41	NAX 228A3	C	N	8.5	Y	+ 9	+10	14779	83	30.09	63	3	94.0	K	M	3	1700	3.0	91.0	3	1700	4.0	1				A	K	3	1700	3.0
													2	94.0	K	M	3	1700	3.0												
													4	90.0	K	M	3	1700	3.0												
378	6	NAX 228A3	F	N	8.5	Y	+10	+10	28052	55	30.18	61	3	92.0	K	P	3	2000	5.5	92.0	3	2000	5.5	1								
													2	94.0	K	P	3	2100	5.5												
													4	90.0	K	M	3	1500	2.4												
386	6	NAX 228A3	F	N	8.5	Y	+ 8	+10	19514	61	29.93	59	3	94.0	K	M	3	2300	4.0	93.0	3	2000	6.0	1								
													2	95.0	K	M	3	2400	4.0												
													4	89.0	K	M	3	2100	5.0												
432	47	NAX 228A3	C	N	8.5	Y	+ 8	+10	6850	70	29.98	50	3	92.0	K	M	3	2000	1.5	89.5	3	2000	3.0	1								
													2	92.0	K	M	3	2000	1.5												
													4	91.5	K	M	3	2000	1.5												
4	29	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	10002	70	30.25	57	3	96.0	K	M	3	1700	1.1	94.0	4	1600	3.0	1	Y	92.6	83.5	A	K	4	1500	3.0
													2	97.5	K	P	4	1600	3.0												
													4	90.5	K	M	3	1600	1.1												
43	8	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	14416	80	29.74	78	3	91.0	K	M	3	1700	1.8	F				1				B	K	3	1700	1.8
													2	92.0	K	M	3	1700	1.8												
													4	88.0	K	M	3	1700	1.8												
44	8	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	7117	80	29.90	69	3	93.0	K	M	2	2950	2.0	90.0	4	1450	4.5	1				B	K	2	2800	2.0
													2	94.0	K	M	2	3050	2.0												
													4	85.0	K	M	3	1800	2.0												

		VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA									TANK FUEL INFORMATION								
													MAXIMUM					PART THROTTLE							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK NK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
94	23	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	9278	70	29.09	68	3	93.0	K	M	2	3000	0.5	90.0	4	1100	2.0	1				A	K	2	3000	0.5
													2	94.0	K	M	2	3000	0.5											
													4	90.0	K	M	4	1100	1.0											
128	62	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	11336	70	30.28	68	3	93.0	K	M	3	1850	0.7	90.0	3	1900	3.0	1	N	92.1	81.6	B	K	3	2250	0.7
													2	94.0	K	M	2	3300	0.8											
													4	88.0	K	M	3	1900	0.7											
147	26	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	9369	85	30.08	92	3	92.0	K	M	4	1050	1.0					1		92.6	82.2	B	K	4	1225	1.0
													2	92.0	K	M	4	1100	1.0											
													4	88.0	K	M	4	1050	1.0											
148	26	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	18342	86	30.08	119	3	91.0	K	M	4	1050	1.0	91.0	4	1050	10.0	1	N	91.8	81.8	N				
													2	91.0	K	M	4	1250	1.0											
													4	90.0	K	M	3	1850	1.5											
175	4	NBH 450A4	F	N	8.6	Y	+ 8	+ 8	8757	87	29.20	87	3	96.0	K	M	3	1900	0.5	F				1	Y	91.9	83.3	A	K	3	1900	0.5
													2	98.0	K	M	3	1950	0.5											
													4	94.0	K	M	4	1300	1.0											
379	6	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	20512	68	29.97	103	3	95.0	K	M	4	1000	0.6	95.0	4	900	2.0	1								
													2	95.0	K	M	4	1000	0.6											
													4	93.0	K	M	4	900	0.6											
380	6	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	10708	64	30.08	76	3	94.0	K	M	4	1000	1.6	93.0	4	1000	2.6	1								
													2	93.0	K	M	4	1000	1.6											
													4	92.0	K	M	4	1000	1.6											
313	40	NB9 238A3	F	N	8.6	Y	- 2	0	30300	57	29.61	70	3	94.0	K	M	3	1800	1.0	F				1				B	K	3	2000	1.0
													2	95.0	K	M	3	1800	1.0											
													4	92.0	K	M	3	1800	1.0											

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION								
							SPARK ADVANCE							MAXIMUM					PART THROTTLE							RATER					
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT NO RES	OCT NO MOT	NINT	NTYPE	NGEAR	RPM	MV
5	29	NFH 450A4	F	N	8.6	Y	+ 6	+ 6	9232	70	29.97	61	3	H	K	P	4	1000	3.0	H	4	1000	3.0	1	Y	96.7	86.3	A	K	4	900	3.0
													2	H	K	P	4	1050	3.0												
													4	H	K	P	4	1100	3.0												
45	8	NFH 450A4	F	N	8.6	Y	+ 6	+ 6	14532	80	29.78	84	3	92.0	K	M	4	1450	1.5	F				1				B	K	3	2100	2.0
													2	93.0	K	M	4	1450	1.5												
													4	88.0	K	M	4	1500	1.5												
95	23	NFH 450A4	F	N	8.6	Y	+ 6	+ 6	11250	39	29.31	14	3	92.0	K	M	4	1100	1.0	92.0	4	1100	2.0	1				B	K	4	1100	1.0
													2	93.0	K	M	4	1100	1.0												
													4	92.0	K	M	4	1200	1.0												
96	23	NFH 450A4	F	N	8.6	Y	+ 6	+ 6	7071	54	28.75	28	3	90.0	K	M	4	1500	1.3	89.0	4	1300	2.0	1				N				
													2	90.0	K	M	4	1500	1.3												
													4	90.0	K	M	4	1400	1.3												
149	26	NFH 450A4	F	N	8.6	Y	+ 6	+ 6	22404	90	30.04	120	3	91.0	K	M	4	1125	1.0	91.0	4	1125	2.0	1		92.2	82.3	B	K	4	1375	1.0
													2	91.0	K	M	4	1375	1.0												
													4	90.0	K	M	4	1175	1.0												
6	29	NF1 228A4	F	N	8.5	Y	+10	+10	11523	70	29.93	62	3	93.0	K	P	4	1200	7.5	93.0	4	1200	7.5	1	N	91.8	84.0	A	K	4	1200	7.5
													2	95.5	K	P	4	1250	7.5												
													4	91.5	K	P	4	1200	7.5												
71	5	NF1 228A4	F	N	8.5	Y	+10	+10	7887	70	30.27	52	3	95.0	K	P	4	1300	3.5	95.0	4	1300	3.5	1	N	98.6	87.8	N				
													2	97.0	K	P	4	1250	3.5												
													4	93.0	K	M	4	1300	2.0												
334	41	NF1 228A4	C	N	8.5	Y	+10	+10	22320	67	30.10	68	3	94.0	K	M	4	1400	3.0	F				1				A	K	4	1400	3.0
													2	94.0	K	M	4	1400	3.0												
													4	92.0	K	M	4	1400	3.0												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
														MAXIMUM					PART THROTTLE									RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
335	41	NF1 228A4	C	N	8.5	Y	+10	+10	23241	72	30.10	63	3	95.0	K	P	4	1400	3.2	95.0	4	1400	3.2	1				A	K	4	1400	3.2
													2	95.0	K	P	4	1400	3.2												
													4	92.5	K	P	4	1400	3.2												
381	6	NF1 228A4	F	N	8.5	Y	+10	+10	7713	61	29.99	63	3	97.0	K	P	4	1500	4.0	97.0	4	1500	4.0	1				A	K	4	1500	1.6
													2	98.0	K	P	4	1500	4.0												
													4	94.0	K	M	4	1500	1.6												
193	7	NGH 450A3	F	N	8.6	Y	+ 6	+ 6	6643	69	29.94	54	3	91.0	K	M	3	2650	0.5	88.0	3	1350	2.0	1	0	95.6	85.0	N				
													2	93.0	K	M	2	2300	0.9												
													4	88.0	K	M	3	2500	0.5												
194	7	NG9 238A3	F	N	8.6	Y	- 2	0	9544	70	30.12	61	3	96.0	K	M	3	1700	2.0	95.0	3	1600	3.0	1	N	93.2	83.1	A	K	3	1800	2.0
													2	97.0	K	M	3	1600	2.0												
													4	92.0	K	M	3	2000	0.8												
7	29	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	19744	70	30.03	70	3	96.0	K	M	2	2600	0.8	F				1	Y	92.3	83.3	A	K	3	2000	1.0
													2	98.0	K	M	2	2500	0.8												
													4	93.0	K	M	2	2600	0.8												
8	29	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	19345	70	30.15	57	3	92.0	K	M	3	2600	1.0	91.0	3	2350	2.0	1		93.0	83.3	A	K	3	2300	2.0
													2	94.5	K	M	3	2350	1.0												
													4	89.0	K	M	3	2600	1.0												
46	8	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	11560	75	29.70	45	3	90.0	K	M	2	2800	0.8	88.0	3	2050	4.5	1				B	K	2	2900	0.8
													2	91.0	K	M	2	2950	0.8												
													4	87.0	K	M	2	3100	0.8												
47	8	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	19521	80	29.78	50	3	87.0	K	M	2	3150	0.6	84.0	3	1800	3.5	1				N				
													2	88.0	K	M	2	3150	0.6												
													4			M																

		VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
													MAXIMUM				PART THROTTLE										RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
72	5	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	6624	70	29.80	54	3	100.0	K	M	3 1350	1.0	97.0	3	1350	3.0	1	N	91.9	82.3	A	K	3	1525	1.0
													2	100.0	K	M	3 1425	1.0												
													4	98.0	K	M	3 1275	1.0												
129	62	NJP F20A3	F	N	9.3	N	+ 4	+ 8	7210	70	30.50	58	3	100.0	K	P	3 2400	7.0	100.0	3	2400	7.0	1	O	93.3	83.2	A	K	2	3800	0.8
													2	102.0	K	P	3 2650	7.0												
													4	94.0	K	M	3 2950	0.8												
176	4	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	7616	82	29.18	51	3	88.0	K	M	2 2550	0.5	87.0	3	1550	3.5	1	Y	91.4	83.5	B	K	2	2600	0.5
													2	91.0	K	M	2 2700	0.5												
													4	87.0	K	M	2 2800	0.5												
263	28	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	15089	70	29.30	55	3	89.0	K	M	3 2400	1.5	87.0	3	1800	5.0	1				B	K	3	2700	1.5
													2	91.0	K	M	3 2600	1.5												
													4	88.0	K	M	3 2300	1.5												
264	28	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	8367	70	29.27	50	3	92.0	K	M	2 2550	0.5	F				1				N				
													2	93.0	K	M	2 2550	0.5												
													4	89.0	K	M	2 2600	0.5												
295	46	NJP F20A3	F	N	9.3	Y	+ 4	+ 6	10800	76	29.50	100	3	84.5	K	M	2 3000	1.0					1				N				
													2	84.5	K	M	2 3000	1.0												
													4	82.0	K	M	3 2600	1.0												
382	6	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	23478	62	29.86	38	3	96.0	K	M	3 2000	1.0	92.0	3	2000	2.0	1				A	K	3	2000	1.0
													2	97.0	K	M	3 2000	1.0												
													4	93.0	K	M	3 3000	0.6												
97	23	NJP F20M5	F	N	9.3	Y	+ 6	+ 6	7548	43	29.30	13	3	89.0	K	M	4 1500	0.1	89.0	4	1500	1.0	1				N				
													2	89.0	K	M	4 1500	0.1												
													4	89.0	K	M	4 1500	0.1												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
							SPARK ADVANCE						MAXIMUM					PART THROTTLE									RATER					
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	DWKNK	OCT RES	OCT MOT	NNINT	NTYPE	GEAR	RPM	MV
48	8	NTC 216A3	F	N	9.0	Y	+ 8	+ 8	14998	80	29.78	100	3	91.0	K	M	3	2150	1.1	F				1				B	K	3	2100	1.5
													2	92.0	K	M	3	2100	1.5												
													4	86.0	K	M	3	2300	1.1												
130	62	NTC 216A3	F	N	9.0	Y	+ 8	+ 8	7099	71	30.13	60	3	88.0	K	M	2	3600	1.2	87.0	3	2800	2.0	1	N	92.2	82.0	B	K	2	3300	1.2
													2	90.0	K	M	2	3300	1.2												
													4	86.0	K	M	3	3200	1.0												
298	48	NTC 216A3	F	N	9.0	Y	+ 8	+ 8	10967	80	28.92	94	3	90.0	K	M	3	2200	2.0					1				N				
													2	90.0	K	M	3	2450	2.0												
													4	88.0	K	M	3	2400	2.0												
383	6	NTC 216A3	F	N	9.0	Y	+ 8	+ 8	6165	62	29.81	34	3	92.0	K	M	3	2100	1.0	92.0	3	2300	2.0	1				A	K	3	2100	1.0
													2	93.0	K	M	3	3100	0.8												
													4	90.0	K	M	3	2700	0.8												
73	5	NTC 216M4	F	N	9.0	N	+ 8	+ 8	15780	70	30.15	74	3	91.0	K	M	4	1600	0.9	88.0	4	1750	2.5	1	N	91.8	81.9	A	K	3	1500	0.8
													2	90.5	K	M	4	2150	0.9												
													4	89.5	K	M	4	1650	0.9												
98	23	NTC 216M4	F	N	9.0	Y	+ 6	+ 6	11218	60	29.23	71	3	89.0	K	M	4	1800	0.4	87.0	4	1800	2.0	1				N				
													2	90.0	K	M	4	1800	0.4												
													4	89.0	K	M	4	1700	0.4												
9	29	NXR F25A3	F	N	9.0	Y	+ 8	+ 8	6549	70	30.27	60	3	90.5	K	M	3	2400	1.4	89.0	3	1350	10.0	1		90.9	83.0	A	K	3	2500	1.4
													2	92.5	K	M	3	2400	1.4												
													4	86.5	K	M	2	2500	1.2												
314	40	NXR F25A3	F	N	9.0	Y	+10	+8	11114	56	30.15	39	3	92.0	K	M	3	2600	1.0	F				1				N				
													2	92.0	K	M	3	2650	1.0												
													4	89.0	K	M	3	2600	1.0												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION								
														MAXIMUM					PART THROTTLE								RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
384	6	NXR F25A3	F	N	9.0	Y	+ 8	+ 8	7985	55	30.18	61	3	98.0	K	M	3	2500	1.0					1				A	K	3	1700	1.0
													2	97.0	K	M	3	2500	1.0												
													4	90.0	K	M	3	2500	1.0												
385	6	NXR F25A3	F	N	9.0	Y	+ 8	+ 8	7550	45	30.30	23	3	93.0	K	M	2	3000	0.8	89.0	3	1600	2.0	1								
													2	94.0	K	M	3	2600	0.8												
													4	89.0	K	M	2	2600	0.4												
214	60	NXX 228A3	F	N	8.5	Y	+ 8	+10	8040	70	30.30	66	3	96.0	K	M	3	2500	1.2	96.0	3	1500	5.0	1	0	91.8	83.6	A	K	2	2500	0.7
													2	98.0	K	M	2	3100	0.7												
													4	93.0	K	M	3	1500	1.5												
265	28	NXX 228A3	F	N	8.5	Y	+10	+10	15983	70	29.74	50	3	93.0	K	P	3	1250	5.0	93.0	3	1250	5.0	1	0	91.5	82.4	A	K	3	1300	5.0
													2	95.0	K	P	3	1300	5.0												
													4	90.0	K	P	3	1450	5.0												
99	23	NY8 F57A4	F	Y	H	9.0	Y	+ 6	+ 6	22772	41	29.34	17	3	91.0	K	M	4	1600	0.6	90.0	4	1100	2.0	1				N				
													2	91.0	K	M	4	1600	0.6												
													4	91.0	K	M	4	1300	0.6												
100	23	NY8 F57A4	F	Y	L	9.0	Y	+ 6	+ 6	22772	41	29.34	17	3	91.0	K	M	4	1600	0.6	90.0	4	1100	2.0	1								
													2	91.0	K	M	4	1600	0.6												
													4	91.0	K	M	4	1300	0.6												
433	47	NY8 F57M4	F	N		9.0	Y	+ 4	+ 6	28500	70	30.17	48	3	91.5	K	P	4	1750	10.0	91.5	4	1750	10.0	1								
													2	91.0	K	M	4	1650	0.0												
													4	91.0	K	M	4	1750	0.0												
219	32	OA2 216M4	F	N		9.0	Y	+ 8	+ 8	11206	85	29.39	65	3	93.0	K	M	4	1750	0.1	93.0	4	1700	1.5	1	Y	90.9	82.4	A	K	3	1600	0.1
													2	92.0	K	M	4	1600	0.1												
													4	92.0	K	M	4	1750	0.1												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
							SPARK ADVANCE							MAXIMUM					PART THROTTLE									RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK NK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
220	32	0A4 216A3	F	N	9.0	Y	+14	+14	10597	85	29.52	63	3	93.0	K	M	3	1300	2.4	91.0	3	1300	4.0	1	N	94.0	83.3	N				
													2	93.0	K	M	3	1450	2.4												
													4	93.0	K	M	3	1300	2.4												
257	28	0A4 216A3	F	N	9.0	Y	+14	+14	10395	70	29.66	50	3	93.0	K	M	3	1500	2.0	92.0	3	1800	4.0	1				A	K	3	1700	4.0
													2	94.0	K	M	3	1400	2.0												
													4	91.0	K	M	3	1500	2.0												
327	41	0A4 216A3	C	N	9.0	N	+14	+14	7697	69	30.18	81	3	91.0	K	M	3	2100	2.0	F				1	N	92.9	83.0	B	K	2	2100	2.0
													2	92.0	K	M	3	2100	2.0												
													4	91.0	K	M	3	2100	2.0												
363	6	0A4 216A3	F	N	9.0	Y	+12	+14	16318	65	30.30	70	3	97.0	K	M	3	1900	1.4	96.0	3	2100	2.5	1				A	K	3	2500	1.4
													2	97.0	K	M	3	2300	1.4												
													4	95.0	K	M	3	1900	1.4												
364	6	0A4 216A3	F	N	9.0	Y	+14	+14	16288	71	30.04	60	3	95.0	K	M	3	1400	0.8	94.0	3	1900	1.8	1				A	K	3	1300	0.8
													2	94.0	K	M	3	1500	0.8												
													4	94.0	K	M	3	1300	0.8												
292	46	0A4 216M5	F	N	9.0	Y	+12	+12	17571	78	29.55	98	3	92.0	K	M	4	1900	0.0					1				B	K	4	2000	0.0
													2	92.0	K	M	4	1900	0.0												
													4	92.0	K	M	4	2000	0.0												
365	6	0A4 216M5	F	N	9.0	N	+12	+12	20000	33	30.15	19	3	93.0	K	M	4	2100	0.4	93.0	4	1900	1.4	1	N	92.8	82.0	A	K	4	2200	1.4
													2	94.0	K	M	4	2050	0.4												
													4	93.0	K	M	4	1900	0.4												
427	47	0A4 216M5	C	N	9.0	Y	+14	+12	15000	70	30.12	50	3	92.0	K	M	4	2100	0.0	91.0	4	1900	1.0	1								
													2	93.0	K	M	4	2000	0.0												
													4	90.0	K	M	4	1900	0.0												

		VEHICLE DESCRIPTION								WEATHER				OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION							
							SPARK ADVANCE							MAXIMUM						PART THROTTLE							RATER					
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK NK	OCT RES	NO MOT	NINT	NTYPE	GEAR	RPM	MV
428	47	OA5 F16A3	C	N	9.0	Y	+10	+10	6200	70	30.10	50	3	88.5	K	M	3	2000	0.2	88.5	3	1750	3.0	1							
													2	89.5	K	M	3	1750	0.2											
													4	88.0	K	M	3	1800	0.2											
258	28	OBW TF23M5	F	Y	H 8.0	Y	+10	+10	15826	70	29.38	50	3	87.0	K	M	4	2200	- 9	85.0	4	2400	6.0	1			N				
													2	87.0	K	M	4	2200	- 9											
													4	86.0	K	M	4	2350	- 9											
259	28	OBW TF23M5	F	Y	L 8.0	Y	+10	+10	15826	70	29.38	50	3	85.0	K	M	4	2350	- 9	85.0	4	2400	6.0	1							
													2	85.0	K	M	4	2200	- 9											
													4	83.0	K	M	4	2400	- 9											
141	26	OB3 F38A3	F	Y	H 8.7	Y	+10	+10	7482	76	30.08	106	3	93.0	K	M	2	1600	0.5					1		91.4	82.3	B	K	3	1650	4.0
													2	93.0	K	M	2	1650	0.5											
													4	90.0	K	M	2	1700	0.5											
142	26	OB3 F38A3	F	Y	L 8.7	Y	+10	+10	7482	76	30.08	106	3	91.0	K	M	2	1650	0.5					1							
													2	90.0	K	M	3	1875	4.0											
													4	89.0	K	M	2	1750	0.5											
221	32	OB3 F38A3	F	Y	H 8.7	Y	+10	+10	12570	85	29.51	66	3	89.0	K	M	2	1950	0.6	86.0	3	1700	3.0	1	N	90.7	82.0	N				
													2	89.0	K	M	2	1900	0.6											
													4	88.0	K	M	2	1700	0.6											
222	32	OB3 F38A3	F	Y	L 8.7	Y	+10	+10	12570	85	29.51	66	3	83.0	K	M	2	1900	0.6	79.0	3	1700	3.0	1							
													2	83.0	K	M	2	1900	0.6											
													4	83.0	K	M	2	1750	0.6											
223	32	OB3 F38A3	F	Y	H 8.7	Y	+10	+10	13533	85	29.28	60	3	91.0	K	P	3	1800	5.0	91.0	3	1800	5.0	1	Y	91.0	82.2	N				
													2	91.0	K	P	3	1800	5.0											
													4	88.0	K	M	3	1900	2.0											

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
														MAXIMUM					PART THROTTLE										RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK NK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
224	32	OB3	F38A3	F Y	L 8.7	Y	+10	+10	13533	85	29.28	60	3	87.0	K	P	3	1900	5.0	87.0	3	1900	5.0	1								
													2	87.0	K	P	3	2000	5.0												
													4	85.0	K	M	3	1800	2.0												
366	6	OB3	F38A3	F Y	H 8.7	Y	+10	+10	10009	41	29.75	23	3	91.0	K	M	3	2000	0.6	90.0	3	1900	2.5	1	N			B	K	3	1600	0.6
													2	93.0	K	M	3	1600	0.6												
													4	91.0	K	M	2	1500	0.4												
367	6	OB3	F38A3	F Y	L 8.7	Y	+10	+10	10009	41	29.75	23	3	90.0	K	M	3	1600	0.6	90.0	3	1900	2.5	1								
													2	92.0	K	M	3	1600	0.6												
													4	90.0	K	M	2	1500	0.4												
38	8	OCR	123A3	F N	9.0	Y	+10	+10	11331	80	30.18	84	3	89.0	K	M	3	1600	1.5	89.0	3	1450	4.0	1				B	K	3	1600	1.5
													2	90.0	K	M	3	1550	1.5												
													4	87.0	K	M	3	1600	1.5												
67	5	OCR	123A3	F N	9.0	Y	+15	+15	13683	70	30.40	55	3	91.0	K	M	2	2900	1.0	88.0	3	1500	3.0	1								
													2	92.0	K	M	2	3500	1.0												
													4	91.0	K	M	3	1450	1.5												
68	5	OCR	123A3	F N	9.0	Y	+10	+10	10516	72	30.37	45	3	89.5	K	M	3	1650	1.6	87.5	3	1700	3.0	1		91.6	82.8	N				
													2	90.0	K	M	3	1800	1.6												
													4	88.0	K	M	2	2050	1.4												
143	26	OCR	123A3	F N	9.0	Y	+15	+15	21240	77	29.94	116	3	92.0	K	M	3	1900	1.5					1		91.4	82.3	B	K	3	1850	1.5
													2	92.0	K	M	3	1950	1.5												
													4	90.0	K	M	3	1850	1.5												
189	7	OCR	123A3	F N	9.0	Y	+15	+15	17103	70	30.50	62	3	91.0	K	M	2	2600	0.7	91.0	3	1850	2.0	1	N	91.9	81.5	A	K	2	2850	0.7
													2	93.0	K	M	2	2850	0.7												
													4	91.0	K	M	3	2150	1.0												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION							
								SPARK ADVANCE						MAXIMUM					PART THROTTLE							RATER					
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
190	7	OCR 123A3	F	N	9.0	Y	+15	+15	12025	70	30.04	61	3	88.0	K	P	3	2250	2.0	88.0	3	2250	2.0	1	N	95.6	85.3	N				
													2	89.0	K	P	3	2650	2.0												
													4	84.0	K	M	3	2400	2.0												
212	60	OCR 123A3	F	N	9.0	Y	+25	+15	6590	70	30.10	66	3	89.0	K	M	3	2100	0.8	87.0	3	1700	2.0	1	N	92.4	82.0	N				
													2	88.0	K	M	3	2100	0.8												
													4	87.0	K	M	3	2100	0.8												
225	32	OCR 123A3	F	N	9.0	Y	+10	+10	13383	85	29.42	66	3	90.0	K	M	3	2500	1.0	88.0	3	2600	2.0	1	N	91.3	82.7	B	K	3	2550	1.0
													2	92.0	K	M	2	4700	2.0												
													4	89.0	K	M	2	2700	1.0												
226	32	OCR 123A3	F	N	9.0	Y	+10	+10	13387	86	29.46	66	3	85.0	K	M	3	2500	1.1	83.0	3	2300	3.0	1	N	90.4	82.8	N				
													2	84.0	K	M	3	2500	1.1												
													4	85.0	K	M	2	2300	1.1												
227	32	OCR 123A3	F	N	9.0	Y	+15	+15	6041	86	29.30	65	3	89.0	K	M	2	2800	1.2	88.0	3	1450	4.0	1	N	91.6	82.1	N				
													2	89.0	K	M	2	3000	1.2												
													4	88.0	K	M	2	2900	1.2												
248	44	OCR 123A3	F	N	9.0	Y	+12	+12	17631	74	29.81	55	3	91.0	K	M	3	2950	0.8	91.0	3	2800	2.4	1				B	K	3	2750	0.8
													2	93.0	K	M	3	2700	0.8												
													4	88.0	K	M	3	2050	0.8												
260	28	OCR 123A3	F	N	9.0	Y	+10	+10	7083	70	29.90	50	3	88.0	K	M	3	1250	1.5	87.0	3	1200	3.0	1				N				
													2	90.0	K	M	3	1350	1.5												
													4	87.0	K	M	3	1300	1.5												
261	28	OCR 123A3	F	N	9.0	Y	+15	+15	14620	70	29.18	55	3	88.0	K	M	3	1600	1.5	87.0	3	1600	3.5	1				N				
													2	89.0	K	M	3	1700	1.5												
													4	86.0	K	M	3	1500	1.5												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION						
							SPARK ADVANCE							MAXIMUM					PART THROTTLE								RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWKN K	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
328	41	OCR 123A3	C	N	9.0	N	+15	+15	12033	71	30.06	70	3	90.5	K	M	3	1800	1.8	88.0	3	1800	3.4	1				B	K	3	1800	1.8
													2	91.0	K	M	3	1800	1.8												
													4	90.0	K	M	3	1800	1.8												
329	41	OCR 123A3	C	N	9.0	N	+15	+15	14824	74	30.12	73	3	91.0	K	M	3	1900	1.8	89.0	4	1900	3.0	1	N	92.8	82.8	B	K	2	1900	1.0
													2	92.0	K	M	3	1900	1.8												
													4	91.0	K	M	3	1900	1.8												
368	6	OCR 123A3	F	N	9.0	Y	+15	+15	24195	73	29.61	70	3	91.0	K	M	3	2000	0.8	90.0	3	1900	2.0	1				N				
													2	91.0	K	M	3	2000	0.8												
													4	90.0	K	M	3	2000	0.8												
369	6	OCR 123A3	F	N	9.0	Y	+10	+10	16225	55	30.20	28	3	98.0	K	P	3	2000	8.0	98.0	3	2000	8.0	1				A	K	3	2000	8.0
													2	101.0	K	P	3	2200	8.0												
													4	93.0	K	M	3	2200	0.8												
370	6	OCR 123A3	F	N	9.0	Y	+10	+10	15211	62	29.81	34	3	93.0	K	M	3	1900	1.0	91.0	3	1900	2.5	1				N				
													2	92.0	K	M	3	2600	1.4												
													4	93.0	K	M	3	1800	1.0												
429	47	OCR 123A3	C	N	9.0	Y	+15	+15	27550	70	30.17	50	3	91.0	K	M	3	2500	0.5	89.5	B	2000	1.5	1								
													2	91.5	K	M	3	2500	0.5												
													4	91.0	K	M	3	2000	0.5												
430	47	OCR 123A3	F	N	9.0	Y	+15	+15	32300	70	29.99	50	3	91.0	K	M	3	2500	1.0					1								
													2	92.5	K	M	3	2500	1.0												
													4	90.5	K	M	3	2250	1.0												
311	40	OCR 123M4	F	N	9.0	N	+15	+15	22752	44	29.97	18	3	91.0	K	M	3	3200	1.0	F				1				N				
													2	92.0	K	M	3	2500	1.0												
													4	88.0	K	M	4	1700	1.0												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION							
														MAXIMUM					PART THROTTLE								RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THER	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
126	62	OCR 123M5	F	N	9.0	Y	+ 6	+10	6447	72	30.10	67	3	88.5	K	M	4	2000	0.7	86.0	4	2100	2.0	1	N	98.2	85.2	N				
													2	90.0	K	M	4	2750	0.7													
													4	88.0	K	M	4	2400	0.7													
228	32	OCR 123M5	F	N	9.0	Y	+15	+15	11351	85	29.44	65	3	88.0	K	M	4	2700	1.0	F				1	N							
													2	87.0	K	M	4	2800	1.0													
													4	86.0	K	M	4	2300	0.7													
229	32	ODF F50A4	F	N	8.4	Y	+ 6	+ 6	12184	85	29.78	67	3	90.0	K	M	3	1500	0.7	90.0	4	1100	3.0	1	N	91.1	83.0	N				
													2	90.0	K	M	3	1600	0.7													
													4	89.0	K	M	3	1500	0.7													
431	47	ODF F50A4	C	N	8.4	Y			13250	70	30.13	50	3	91.0	K	M	4	1750	1.2	90.0	4	1300	5.0	1								
													2	91.0	K	M	3	2700	0.5													
													4	89.5	K	M	3	2500	0.5													
144	26	ODW TF23A3	F	Y	H	8.0	Y	+10	+10	6986	75	29.96	92	3	93.0	K	M	3	2875	- 8	F				1		91.4	82.3	N				
													2	93.0	K	M	3	2600	- 8													
													4	93.0	K	M	3	3000	- 8													
145	26	ODW TF23A3	F	Y	L	8.0		+10	+10	6986	75	29.96	92	3	87.0	K	M	3	2750	- 8					1								
													2	87.0	K	M	3	2725	- 8													
													4	86.0	K	M	3	2950	- 8													
39	8	OD3 F38A3	F	N		8.7	Y	+10	+10	12235	80	29.82		3	90.0	K	M	2	2300	0.6	86.0	3	1550	4.0	1				B	K	2	2100	0.6
													2	91.0	K	M	2	2300	0.6													
													4	89.0	K	M	2	2250	0.6													
127	62	OD3 F38A3	F	N		8.7	Y	+ 6	+10	13355	72	30.28	56	3	94.0	K	M	2	2050	0.5	94.0	3	1950	4.0	1				A	K	2	2600	0.5
													2	96.0	K	M	2	2000	0.5													
													4	93.0	K	M	2	2000	0.5													

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION						
														MAXIMUM					PART THROTTLE								RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
191	7	0D3	F38A3	F	N	8.7	Y	+ 6	+10	13821	76	30.22	54	3	92.0	K	M	2	1950	0.6	91.0	3	1950	3.0	1				B	K	2	1900	0.6
														2	93.0	K	M	2	1950	0.6											
														4	89.0	K	M	2	1800	0.6											
230	32	0D3	F38A3	F	N	8.7	Y	+11	+11	16867	85	29.25	76	3	96.0	K	M	3	2100	3.5	95.0	3	2000	5.0	1	Y	90.3	82.8	A	K	3	1800	3.5
														2	96.0	K	P	3	1900	5.0											
														4	95.0	K	M	3	2000	3.5											
371	6	0D3	F38A3	F	N	8.7	Y	+10	+10	22098	66	30.05	63	3	93.5	K	M	2	2000	0.6	93.0	3	2000	2.0	1				A	K	2	2400	0.4
														2	94.0	K	M	3	2000	0.6											
														4	93.0	K	M	2	2500	0.6											
146	26	0EF	F50A4	F	N	8.4	Y	+10	+10	18688	84	30.06	77	3	87.0	K	M	4	1125	2.5					1		92.1	82.0	N				
														2	89.0	K	M	3	2000	1.0											
														4	88.0	K	M	4	1500	1.0											
231	32	0E3	F38A3	F	N	8.7	Y	+10	+10	10660	85	29.50	66	3	92.5	K	M	2	3000	1.3	F				1	N	89.8	82.0	A	K	2	3600	1.5
														2	92.0	K	M	2	3000	1.3											
														4	92.0	K	M	2	1850	1.5											
330	41	0E3	F38A3	C	N	8.7	Y	+10	+10	19741	65	30.20	60	3	91.5	K	M	2	2800	0.8	F				1				A	K	2	2800	0.8
														2	93.0	K	M	2	2800	0.8											
														4	91.0	K	M	2	2800	0.8											
372	6	0E3	F38A3	F	N	8.7	Y	+10	+12	17090	63	30.12	77	3	97.0	K	M	2	2900	1.0	96.0	3	2300	2.2	1	N	92.8	83.8	A	K	3	2000	2.2
														2	100.0	K	M	2	2800	1.0											
														4	94.0	K	M	2	2000	1.0											
373	6	0E3	F38A3	F	N	8.7	Y	+10	+10	27894	61	29.93	59	3	94.0	K	M	2	2700	1.0	92.0	3	2000	2.0	1				A	K	2	2000	
														2	95.0	K	M	2	2800	1.0											
														4	92.0	K	M	2	2000	1.0											

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					PART THROTTLE											RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
262	28	OE3	F38A4	F	N	8.7	Y	+10	+10	16067	70	29.37	50	3	90.0	K	M	3	1450	1.2	87.0	4	1500	3.0	1				B	K	3	1400	1.2
														2	92.0	K	M	3	1500	1.2												
														4	90.0	K	M	3	1450	1.2												
213	80	OFF	F50A3	F	N	8.4	Y	+10	+10	9034	70	30.24	54	3	92.0	K	M	3	2200	0.7	90.0	3	2100	2.3	1	0	93.0	82.2	B	K	3	2500	0.7
														2	94.0	K	M	3	2400	0.7												
														4	90.0	K	M	3	1900	0.7												
232	32	OFF	F50A4	F	N	8.4	Y	+10	+10	7361	85	29.48	65	3	90.0	K	M	4	1600	1.4	88.0	4	1600	2.3	1	0	91.5	82.6	N				
														2	91.0	K	M	4	1600	1.4												
														4	90.0	K	M	4	1600	1.4												
233	32	OFF	F50A4	F	N	8.4	Y	+10	+10	13651	86	29.67	64	3	90.0	K	M	4	1550	1.8	89.0	4	1700	3.0	1	Y	91.3	82.1	B	K	4	1400	2.5
														2	90.0	K	M	4	1500	1.8												
														4	90.0	K	M	3	1600	1.4												
293	46	OFF	F50A4	F	N	8.4	Y	+ 7	+10	19474	77	29.42	78	3	97.0	K	M	3	2000	1.5					1				A	K	4	1100	2.5
														2	98.0	K	M	3	2300	1.5												
														4	94.5	K	M	3	1550	1.5												
34	8	PKC	222A3	F	N	9.0	Y	+10	+10	6598	80	30.21	45	3	92.0	K	P	3	2050	6.0	92.0	3	2050	6.0	1				B	K	3	2100	6.0
														2	95.0	K	P	3	2050	6.0												
														4	89.0	K	M	3	2650	1.3												
136	28	PKC	222A3	F	N	9.0	Y	+10	+10	14478	80	30.10	82	3	90.0	K	M	3	2625	1.0					1		92.5	82.4	N				
														2	90.0	K	M	3	2600	1.0												
														4	88.0	K	M	2	2600	1.0												
172	4	PKC	222A3	A	N	9.0	Y	+10	+10	6435	82	29.18	75	3	82.0	K	M	2	2700	0.8	80.0	3	2450	3.0	1	N	93.3	83.7	N				
														2	85.0	K	M	2	2650	0.8												
														4	82.0	K	M	2	2700	0.8												

		VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION								
							SPARK ADVANCE						MAXIMUM					PART THROTTLE								RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NO	NINT	NTYPE	GEAR	RPM	MV
290	46	PKC 222A3	F	N	9.0	Y	+10	+10	7427	78	29.42	98	3	84.0	K	M	3	2650	1.2				1					N				
													2	85.0	K	M	3	2650	1.2													
													4	82.0	K	M	3	2600	1.2													
321	41	PKC 222A3	C	N	9.0	N	+10	+10	15575	78	29.97	53	3	88.0	K	M	2	2900	1.4	F			1					N				
													2	88.0	K	M	2	2900	1.4													
													4	87.0	K	M	2	2900	1.4													
353	6	PKC 222A3	F	N	9.0	Y	+ 6	+10	12380	74	30.05	98	3	94.0	K	M	2	3200	0.5				1					A	K	3	2400	0.5
													2	94.0	K	M	2	2800	0.5													
													4	88.0	K	M	3	2500	0.5													
354	6	PKC 222A3	F	N	9.0	Y	+10	+10	11250	64	30.10	76	3	95.0	K	P	3	2300	7.0	95.0	3	2300	7.0	1	Y	97.5	87.6	A	K	3	2200	7.0
													2	98.0	K	P	3	2400	7.0													
													4	90.0	K	M	3	2600	0.4													
425	47	PLC 222A3	C	N	9.0	Y	+14	+10	20892	70	30.03	40	3	95.0	K	M	3	3000	0.5				1									
													2	96.0	K	M	3	3000	0.5													
													4	92.0	K	M	3	2400	0.5													
421	31	PKC 222M5	F	N	9.0	Y	+12	+12	22368	76	28.82	82	3	90.0	K	M	4	1700	1.9				1									
													2																			
													4																			
35	8	PLC 222A3	F	N	9.0	Y	+10	+10	15023	75	29.95	53	3	84.0	K	M	2	2900	1.0	F			1					N				
													2	86.0	K	M	3	2150	3.6													
													4	82.0	K	M	2	2700	1.0													
63	5	PLC 222A3	F	N	9.0	N	+10	+10	6077	72	29.90	71	3	88.0	K	M	2	2250	1.2	F			1	N	92.0	82.7	N					
													2	88.5	K	M	2	2675	1.2													
													4	86.0	K	M	2	2725	1.2													

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION						
							SPARK ADVANCE							MAXIMUM					PART THROTTLE							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
184	7	PLC 222A3	F	N	9.0	Y	+ 8	+10	7008	70	30.12	68	3	88.0	K	M	2	2250	1.1	87.0	3	2350	2.0	1	0	92.0	81.5	B	K	2	3250	1.1
													2	88.0	K	M	3	2650	1.0													
													4	84.0	K	M	2	2650	1.0													
355	6	PLC 222A3	F	N	9.0	Y	+10	+10	14010	66	30.05	63	3	88.0	K	M	2	3600	0.4	87.0	3	2600	2.0	1				N				
													2	90.0	K	M	2	3900	0.4													
													4	85.5	K	M	3	2800	0.5													
426	47	PLC 222A3	C	N	9.0	Y	+10	+10	21400	70	29.98	50	3	84.0	K	M	3	2500	0.2					1								
													2	86.5	K	M	3	3200	0.2													
													4	83.0	K	M	3	2500	0.2													
33	8	RA6 F14A3	F	N	9.0	Y			22123	77	29.53	42	3	87.0	K	M	3	2600	1.1	87.0	3	2250	4.1	1				N				
													2	88.0	K	M	3	2500	1.1													
													4	86.0	K	M	3	2700	1.1													
252	28	RA6 F14A3	F	N	9.0	Y	0	0	14780	70	29.38	50	3	88.0	K	M	3	2750	1.0	86.0	3	2450	3.0	1				N				
													2	88.0	K	M	3	2500	1.0													
													4	87.0	K	M	3	2500	1.0													
320	41	RA6 F14A3	C	N	9.0	Y			19292	64	30.04	54	3	92.0	K	M	2	3500	0.8	F				1				A	K	2	3500	0.8
													2	93.0	K	M	2	3500	0.8													
													4	91.0	K	M	2	3500	0.8													
350	6	RA6 F14A3	F	N	9.0	Y			12136	72	29.91	96	3	93.0	K	M	3	2700	0.8	92.0	3	2500	2.0	1								
													2	94.0	K	M	3	3000	0.8													
													4	90.0	K	M	3	3000	0.8													
351	6	RA6 F14A3	F	Y	H	9.0	Y	+ 8	+ 8	8827	80	30.18	105	3	94.0	K	M	3	3000	0.4	94.0	3	3000	2.2	1				A	K	3	3000	0.4
													2	97.0	K	M	3	3000	0.4													
													4	91.0	K	M	3	2900	0.4													

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION						
							SPARK ADVANCE							MAXIMUM					PART THROTTLE							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
352	6	RA8 F14A3	F	Y	L	9.0	Y	+ 8	+ 8	8827	80	30.18	105	3	93.0	K	M	3	3000	0.4	93.0	3	3000	2.2	1							
														2	95.0	K	M	3	3000	0.4											
														4	90.0	K	M	3	2900	0.4											
249	44	SGF F50A4	F	N		8.4	Y	+ 6	+10	19074	73	29.95	45	3	95.0	K	M	2	2850	0.6					1			B	K	2	2800	0.8
														2	97.0	K	M	2	2900	0.6											
														4	89.0	K	M	4	1600	1.4											
332	41	SGF F50A4	C	N		8.4	Y	+10	+10	18295	62	29.98	70	3	92.0	K	M	3	1800	1.4	F				1			B	K	3	1800	1.4
														2	92.0	K	M	3	1800	1.4											
														4	90.0	K	M	3	1800	1.4											
250	44	SHF F50A4	F	N		8.4	Y	+ 5	+10	23366	76	29.70	51	3	96.0	K	P	4	1650	7.0	96.0	4	1650	7.0	1			B	K	3	2000	0.8
														2	98.0	K	P	4	1700	7.0											
														4	93.0	K	M	3	1700	0.8											
376	6	SHF F50A4	F	N		8.4	Y	+10	+10	13165	68	29.97	78	3	91.0	K	M	4	1200	1.0	90.0	4	1200	20.	1			N				
														2	90.5	K	M	4	1300	1.0											
														4	91.0	K	M	3	1600	0.5											
85	5	KTSC 222M4	F	N		9.0	N	+10	+10	6946	70	29.80	50	3	92.0	K	M	4	1650	0.5	91.0	4	1900	2.5	1	N	93.6	82.8	B	K	4	1400	0.5
														2	93.0	K	M	4	1475	0.5											
														4	92.0	K	M	4	1550	0.5											
442	47	KVMT 252A3	C	N		8.2		+16	+16	11050	70	29.94	50	3	100.0	K	M	3	2500	1.4					1	Y		A	K	3	2000	1.4
														2	101.0	K	M	3	2600	1.4											
														4	99.0	K	M	3	2500	1.4											
284	28	KVSC 222A3	F	N		9.0	Y	+10	+10	10524	70	29.24	55	3	85.0	K	M	3	2900	1.5	84.0	3	2600	3.5	1			N				
														2	86.0	K	M	3	2800	1.5											
														4	82.0	K	M	3	2600	1.5											

		VEHICLE DESCRIPTION								WEATHER				OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION								
															MAXIMUM					PART THROTTLE								RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
162	26	NTLH 450A3	F	Y H	9.2	Y	+ 4	+ 4	9727	77	30.10	86	3	L						L				1		93.9	84.2	N				
													2	L																		
													4	L																		
163	26	NTLH 450A3	F	Y L	9.2	Y	+ 4	+ 4	9727	77	30.10	86	3	L						L				1								
													2	L																		
													4	L																		
121	23	NTLH 450A4	F	Y H	9.2	Y	+ 4	+ 4	6599	47	29.36	18	3	88.0	K	M	4	1100	0.8	87.0	4	1100	1.0	1				N				
													2	89.0	K	M	4	1100	0.8												
													4	87.0	K	M	4	1100	0.8													
122	23	NTLH 450A4	F	Y L	9.2	Y	+ 4	+ 4	6599	47	29.36	18	3	85.0	K	M	4	1100	0.8	84.0	4	1100	2.0	1								
													2	85.0	K	M	4	1100	0.8												
													4	83.0	K	M	3	1900	1.0													
344	41	NTLL 457A4	C	N	8.2	Y	+ 6	+ 6	15968	71	30.00	64	3	87.0	K	M	4	1400	1.6	F				1	N			N				
													2	87.0	K	M	4	1400	1.6													
													4	85.0	K	M	4	1400	1.6													
123	23	NTSB 228A4	F	N	8.5	Y	+12	+12	6254	60	29.36	38	3	91.0	K	M	4	1500	1.9	90.0	4	1500	3.0	1				N				
													2	91.0	K	M	4	1500	1.9												
													4	90.0	K	M	4	1500	1.9													
164	26	NTSB 228A4	F	N	8.5	Y	+12	+12	19694	75	30.23	34	3	94.0	K	M	4	1500	2.0	94.0	4	1475	3.0	1	N	93.0	82.7	B	K	4	1550	2.0
													2	94.0	K	M	4	1550	2.0													
													4	94.0	K	M	4	1475	2.0													
183	5	NTSB 228A4	F	N	8.5	N	+10	+12	7307	70	30.30	52	3	91.0	K	M	4	1450	2.0	90.0	4	1400	3.5	1	N	99.2	87.5	N				
													2	91.0	K	M	4	1400	2.0													
													4	91.0	K	M	4	1400	2.0													

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION									
														MAXIMUM					PART THROTTLE								RATER					
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWKN K	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
307	46	NTSB 228A4	F	N	8.5	Y	+12	+12	8438	75	29.40	76	3	88.0	K	M	4	1700	2.2					1				N			
													2	88.0	K	M	4	1700	2.2												
													4	88.0	K	M	4	1700	2.2												
443	47	NTSB 228A4	C	N	8.5	Y	+10	+10	13326	70	29.98	50	3	H	K	M	4	1800	2.0					1								
													2	H	K	M	4	1800	2.0												
													4	H	K	M	4	1700	2.0												
444	47	NTSB 228A4	C	N	8.5	Y	+10	+10	17250	70	29.96	50	3	H	K	M	4	1300	0.4	F				1								
													2	H	K	M	4	1300	0.4												
													4	H	K	M	4	1400	0.4												
165	26	NTSB 228M5	F	N	8.5	Y	+ 8	+ 8	15249	84	29.88	135	3	87.0	K	M	4	2100	0.5	84.0	4	1800	1.5	1	N	97.4	87.0	N				
													2	88.0	K	M	3	3000	0.5												
													4	86.0	K	M	4	2150	0.5												
124	23	NVLD 241A3	F	N	8.3	Y	+10	+10	12344	68	28.90	69	3	88.0	K	M	3	2100	1.0	86.0	3	2000	3.0	1				N				
													2	90.0	K	M	3	2200	1.0												
													4	87.0	K	M	3	2000	1.0												
26	29	NVLF 450M4	F	N	8.6	Y	+ 6	+ 6	10133	70	30.10	60	3	92.0	K	M	4	1600	1.1	F				1	N	91.4	83.3	B	K	4	1700	1.1
													2	94.0	K	M	4	1600	1.1												
													4	88.5	K	M	4	1500	1.1												
179	4	NVLH 450A3	F	Y	H	9.2	N	+ 5	+ 5	6636	90	29.10	88	3	91.0	K	M	3	2050	0.5	87.0	3	1950	2.0	1	N	91.8	82.8	N				
													2	92.0	K	M	3	2150	0.5												
													4	90.0	K	M	3	2050	0.5												
180	4	NVLH 450A3	F	Y	L	9.2	N	+ 5	+ 5	6636	90	29.10	88	3	84.0	K	M	3	2100	0.5					1								
													2	85.0	K	M	3	2000	0.5												
													4	82.0	K	M	3	2000	0.5												

		VEHICLE DESCRIPTION									WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION									
								SPARK ADVANCE							MAXIMUM					PART THROTTLE								RATER						
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWKN	OCT RES	NO MOT	NINT	NTYPE	GEAR	RPM	MV
286	28	NVMH 450A3	F	Y	H	9.2	Y	+ 4	+ 4	16833	70	29.32	50	3	88.0	K	M	3	2100	1.5	88.0	3	2000	3.0	1				N				
														2	89.0	K	M	3	2250	1.5												
														4	87.0	K	M	3	2000	1.5												
287	28	NVMH 450A3	F	Y	L	9.2	Y	+ 4	+ 4	16833	70	29.32	50	3	84.0	K	M	3	2100	1.5	84.0	3	2000	3.0	1								
														2	86.0	K	M	3	2100	1.5												
														4	82.0	K	M	3	2200	1.5												
208	7	NVML 457A4	F	N		8.2	Y	+10	+ 8	10589	70	30.21	61	3	96.0	K	M	2	2100	0.5	F				1	N	96.0	85.5	B	K	4	1150	0.2
														2	98.0	K	M	2	2850	0.5												
														4	91.0	K	M	4	1150	0.2												
178	4	OTLA 123M4	F	N		9.0	N	+ 7	+ 7	9045	83	29.18	68	3	98.0	K	P	4	1300	1.5	96.0	4	1300	1.5	1	Y	91.7	82.2	A	K	4	1900	0.5
														2	96.0	K	M	4	1700	0.5												
														4	95.0	K	P	4	1450	1.5												
244	32	OTLS 228M5	F	Y	H	8.7	Y	+10	+10	15232	86	29.36	66	3	93.0	K	M	3	1500	0.5	93.0	4	1900	2.0	1	Y	91.2	82.2	B	K	4	1900	2.0
														2	93.0	K	M	3	1500	0.5												
														4	93.0	K	M	3	1300	0.5												
245	32	OTLS 228M5	F	Y	L	8.7	Y	+10	+10	15232	86	29.36	66	3											1	Y							
														2	88.0	K	M	3	1300	0.5												
														4	88.0	K	M	4	1700	0.5												
87	5	OTMY 149M3	F	N		8.4	N	+10	+10	6486	72	30.41	53	3	90.5	K	M	3	1650	0.5	88.0	3	1100	2.0	1	N	92.2	82.7	A	K	3	1700	0.5
														2	91.5	K	M	3	1600	0.5												
														4	91.5	K	M	3	1700	0.5												
88	5	OTSS 228M4	F	N		8.7	Y	+10	+10	23597	70	30.10	53	3	91.0	K	M	3	1575	1.0	89.0	4	1600	4.0	1	N	92.0	82.6	N				
														2	91.0	K	M	3	1600	1.0												
														4	90.0	K	M	3	1600	1.0												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION								
							SPARK ADVANCE							MAXIMUM					PART THROTTLE							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
205	7	OTSY 149M4	F	N	8.4	N	+10	+10	6469	70	30.42	60	3	90.0	K	M	3	1100	1.5	90.0	4	1100	2.4	1	N	91.9	82.7	B	K	3	1300	1.5
													2	91.0	K	M	3	1300	1.5												
													4	90.0	K	M	3	1050	1.5												
246	32	OVMG 250A4	F	N	8.3	Y	+ 8	+ 8	8872	85	29.22	70	3	89.0	K	M	3	1500	1.3	88.0	4	1500	6.0	1	Y	91.6	82.0	N				
													2	89.0	K	M	3	1500	1.3												
													4	89.0	K	M	3	1600	1.3												
247	32	OVMY 149A3	F	N	8.4	Y	+22	+10	9677	85	29.16	65	3	90.0	K	M	3	2300	1.9					1	N							
													2	91.0	K	M	3	2300	1.9												
													4	90.0	K	M	3	2300	1.9												
285	28	OVMY 149A3	F	N	8.4	Y	+10	+10	14512	70	29.37	50	3	87.0	K	M	3	1850	1.5	84.0	3	1800	3.0	1				B	K	3	1750	1.5
													2	88.0	K	M	3	1800	1.5												
													4	84.0	K	M	3	1950	1.5												
204	7	PVSC 222A3	F	N	9.0	Y	+10	+10	14954	70	29.92	66	3	87.0	K	M	3	2700	1.3	85.0	3	2700	2.3	1				N				
													2	90.0	K	M	2	2950	0.8												
													4	84.0	K	M	2	2850	0.8												
441	47	PVSG 226A3	C	N	8.7	Y	+ 7	+ 7	14700	70	30.08	50	3	85.0	K	M	3	2500	1.0					1								
													2	85.5	K	M	3	2500	1.0												
													4	83.0	K	M	3	2500	1.0												
282	28	RVS2 225A3	F	Y	H	9.2	Y	+12	+12	16421	70	29.28	50	3	84.0	K	M	3	2000	1.5	82.0	3	1900	3.0	1				B	K	3	1900	1.5
													2	85.0	K	M	3	2200	1.0												
													4	84.0	K	M	3	1950	1.5												
283	28	RVS? 225A3	F	Y	L	9.2	Y	+12	+12	16421	70	29.28	50	3	82.0	K	M	3	2100	1.5	82.0	3	1900	3.0	1								
													2	84.0	K	M	3	2200	1.0												
													4	81.0	K	M	3	2000	1.5												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION								
														MAXIMUM					PART THROTTLE											RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
27	29	A F20M5	F	N	9.25	Y	+16	+16	8141	70	30.12	57	3	96.5	K	M	4	1600	1.5	94.0	4	1900	3.5	1	Y	96.4	86.7	A	K	4	1500	1.5
													2	98.0	K	M	4	1600	1.5													
													4	95.5	K	M	4	1800	1.5													
28	29	A TF20A3	F	N	8.5	Y	+20	+20	6925	70	31.25	62	3	100.0	K	P	3	1700	5.5	100.0	3	1100	5.5	1	O	92.2	86.7	A	K	3	1700	5.5
													2	H	K	P	3	1700	5.5													
													4	98.0	K	P	3	1800	5.5													
402	6	AU F21A3	F	N	8.2	Y	+ 6	+ 6	18495	44	29.57	30	3	83.0	K	M	3	3200	0.6	80.0	3	2800	1.6	1		93.0	81.9	N				
													2	87.0	K	M	2	3000	0.6													
													4	81.0	K	M	3	2800	1.0													
403	6	B F18M5	F	N	8.5	Y	+ 6	+ 6	11801	60	30.34	56	3	86.0	K	M	4	2100	0.4	85.0	4	2100	1.6	1	N	93.0	83.9	N				
													2	88.0	K	M	4	2000	0.4													
													4	85.0	K	M	4	2100	0.4													
345	41	C 216A3	C	N	8.5	N	+ 2	+ 5	7566	68	30.04	60	3	85.0	K	M	3	2850	2.6	F				1				N				
													2	87.0	K	M	3	2850	2.6													
													4	84.0	K	M	3	2850	2.6													
88	5	E 216A3	F	N	9.4	Y	+ 8	+ 8	7110	70	30.10	50	3	87.0	K	M	3	2400	2.2	F				1								
													2	88.0	K	M	3	2550	2.2													
													4	87.0	K	M	3	2450	2.2													
134	62	E 216A3	F	N	9.4	N	+ 5	+ 8	13593	70	30.20	50	3	90.0	K	M	3	2550	1.5	88.0	3	2400	3.5	1	N	92.1	83.0	A	K	3	2800	1.5
													2	93.0	K	M	2	3400	1.3													
													4	89.0	K	M	3	2300	1.5													
133	62	E 216M5	F	N	9.4	Y	+15	+15	10393	67	30.22	50	3	87.0	K	M	4	2450	1.5	86.0	4	2200	2.5	1	N	92.7	83.3	N				
													2	87.0	K	M	4	2500	1.5													
													4	83.0	K	M	4	2300	1.5													

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
								SPARK ADVANCE						MAXIMUM					PART THROTTLE								RATER							
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWKN K	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
207	7	E 216M5	F	N	9.4	N	+15	+15	11303	70	30.00	66	3	98.0	K	M	4	2350	1.3	98.0	4	1850	2.3	1	N	92.3	82.6	A	K	3	3400	1.2
													2	99.0	K	M	4	2400	1.3													
													4	93.0	K	M	4	2050	1.3													
404	6	E 216M5	F	N	9.4	Y	+15	+15	9980	46	29.90	18	3	87.0	K	M	4	2200	0.7	87.0	4	2000	1.7	1	N			N				
													2	88.0	K	M	3	4500	0.5													
													4	91.0	K	M	4	1800	0.7													
405	6	E 216M5	F	N	9.4	Y	+15	+15	18551	50	30.18	40	3	89.0	K	M	3	3200	1.0	F				1	N	98.5	88.0	N				
													2	90.0	K	M	3	3200	1.0													
													4	90.0	K	M	4	1500	1.0													
288	28	E F20A3	F	N	8.5	Y	0	0	15971	70	29.42	55	3	84.0	K	M	3	2300	1.0	82.0	3	2000	3.0	1				B	K	3	1900	1.0
													2	86.0	K	M	3	2100	1.0													
													4	83.0	K	M	3	2100	1.0													
406	6	E F20A3	F	N	8.5	Y	- 1	0	9500	64	30.14	46	3	86.0	K	M	3	2500	0.8	82.0	3	2700	2.0	1	N	93.0	83.1	N				
													2	87.0	K	M	3	2500	0.8													
													4	85.0	K	M	3	2800	0.8													
407	8	E F30A4	F	N	9.0	Y	+20	+20	6370	57	29.73	35	3	86.0	K	M	4	2600	0.8	85.0	4	2500	1.0	1	N	97.5	87.4	N				
													2	87.0	K	M	4	2600	0.8													
													4	86.0	K	M	4	2600	0.8													
89	5	E F30M5	F	N	9.0	Y	+20	+20	12776	75	30.27	76	3	89.0	K	M	3	1100	0.5	F				1	N	92.9	82.7	N				
													2	85.0	K	M	3	1200	0.5													
													4	88.0	K	M	3	1100	0.5													
166	26	E F30M5	F	N	9.0	Y	+30	+20	16882	73	30.18	80	3	84.0	K	M	4	2325	0.5					1	N	91.7	81.8	N				
													2	83.0	K	M	4	2325	0.5													
													4	84.0	K	M	4	2025	0.5													

			VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION							
															MAXIMUM					PART THROTTLE									RATER			
OBS NO	LAB NO		MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK NK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
318	40	E	TF30A4	F	Y	H 7.8	Y	+20	+20	6000	40	29.90	28	3	87.0	K	M	3	3900	-10					1				N			
														2	87.0	K	M	3	4000	-10												
														4	87.0	K	M	3	4100	-10												
319	40	E	TF30A4	F	Y	L 7.8	Y	+20	+20	6000	40	29.90	26	3	86.0	K	M	3	4100	-10					1							
														2	86.0	K	M	3	4200	-10												
														4	86.0	K	M	3	4050	-10												
408	6	J	315M5	F	N	9.3	N	+20	+20	11490	44	30.31	21	3	89.0	K	M	3	2800	1.0	87.0	4	2000	2.0	1	N	95.8	86.5	N				
														2	92.0	K	M	3	4100	1.0												
														4	88.0	K	M	4	2100	1.0												
181	4	J	318A4	A	N	8.8	N	+18	+18	9920	80	29.03	63	3	82.0	K	M	2	2800	1.3	F				1	N	92.5	83.3	N				
														2	82.0	K	M	2	2800	1.3												
														4	80.0	K	M	2	2900	1.3												
308	46	J	318A4	F	N	8.8	Y	+18	+18	10207	78	29.30	86	3	78.0	K	M	4	2700	3.0					1				N			
														2	78.0	K	M	4	2550	3.0												
														4	77.0	K	M	4	2500	3.0												
348	41	J	318A4	C	N	8.8	Y	+18	+18	6893	74	30.03	64	3	87.0	K	M	3	3200	1.8	F				1	N	92.9	83.1	N				
														2	87.0	K	M	3	3200	1.8												
														4	85.0	K	M	3	3200	1.8												
409	6	J	318A4	F	N	8.8	Y	+18	+18	17650	65	30.30	70	3	85.0	K	M	2	3300	1.4					1	N	93.0	83.6	N				
														2	86.0	K	M	2	3500	1.4												
														4	84.0	K	M	2	3500	1.4												
410	6	J	318M5	F	N	8.8	Y	+20	+20	10040	58	29.86	41	3	90.0	K	M	4	2000	1.0	90.0	4	2500	3.0	1	N			N				
														2	91.0	K	M	3	2300	1.0												
														4	90.0	K	M	3	2100	1.0												

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION								
								SPARK ADVANCE						MAXIMUM					PART THROTTLE							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
445	47	J 318M5	C	N	8.8	Y	+24	+20	6800	70	29.94	50	3	90.0	K	M	4	2250	0.7	F				1							
													2	90.0	K	M	4	2250	0.7												
													4	88.5	K	M	4	2000	0.7												
446	47	J 318M5	C	N	8.8	Y	+18	+18	15002	70	29.96	50	3	91.0	K	M	3	3000	0.6	F				1	N			N			
													2	91.0	K	M	3	3000	0.6												
													4	89.0	K	M	3	2000	0.6												
447	47	J 318M5	C	N	8.8	Y	+18	+18	25800	70	29.94	48	3	86.0	K	M	4	2500	0.6					1	N			N			
													2	86.0	K	M	4	2500	0.6												
													4	85.0	K	M	4	2500	0.6												
448	47	Q 218M4	F	N	8.7	Y	+10	+ 8	9700	70	30.10	50	3	90.5	K	M	4	1500	0.5	88.5	4	1200	1.5	1							
													2	91.5	K	M	4	2500	0.5												
													4	89.0	K	M	4	1500	0.5												
187	26	Q 218M5	F	N	8.7	Y	+ 8	+ 8	13864	81	30.05	116	3	99.0	K	M	3	1400	0.0					1	N	92.0	82.2	B	K	4	1500	0.5
													2	99.0	K	M	3	1400	0.0												
													4	94.0	K	M	4	1475	0.0												
411	6	Q 218M5	F	N	8.7	Y	+ 8	+ 8	36298	44	30.31	21	3	93.0	K	M	4	1600	0.8	93.0	4	1500	5.0	1	N	92.0	83.2	A	K	4	2000	1.2
													2	96.0	K	M	3	3400	2.0												
													4	93.0	K	M	4	2000	1.2												
182	4	T 215A3	F	N	9.0	N	+ 7	+ 7	10974	72	29.44	21	3	90.0	K	M	3	2550	0.7	90.0	3	2400	2.0	1	N	93.8	84.9	B	K	3	2500	0.7
													2	91.0	K	M	3	2600	0.7												
													4	89.0	K	M	3	2500	0.7												
412	6	T 215A3	F	N	9.0	Y	+ 5	+ 5	13025	61	30.28	47	3	91.0	K	M	2	3200	1.4	F				1							
													-	95.0	K	M	2	3800	1.8												
													4	89.0	K	M	3	2500	1.8												

		VEHICLE DESCRIPTION							WEATHER				OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
														MAXIMUM					PART THROTTLE										RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK N K	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
31	29	T 215M4	F	N	9.0	N	+ 5	+ 5	9387	70	30.25	57	3	94.0	K	M	4	1500	0.2	92.0	4	1550	1.5	1	Y	92.6	83.2	A	K	4	1400	1.5
													2	96.0	K	M	4	1500	0.2													
													4	94.5	K	M	3	1500	0.3													
30	29	T 216A3	F	N	9.0	Y	+ 5	+ 5	7037	70	29.87	59	3	94.0	K	M	2	2400	1.4	90.5	3	2300	2.5	1	N			B	K	3	2800	1.5
													2	93.5	K	M	2	2600	1.4													
													4	94.5	K	M	3	2700	1.5													
62	8	T 216A3	C	N	9.0	Y	+ 5	+ 5	24641	75	29.59	58	3	91.0	K	M	2	3000	0.8	F				1				B	K	2	3000	0.8
													2	94.0	K	M	2	2900	0.8													
													4	89.0	K	M	3	2100	1.5													
168	26	T 216A3	F	N	9.0	Y	+ 8	+ 5	16918	80	30.13	74	3	88.0	K	M	3	2050	1.0					1		92.4	82.3	N				
													2	86.0	K	M	3	1900	1.0													
													4	86.0	K	M	3	1900	1.0													
216	60	T 216A3	F	N	9.0	Y	+ 5	+ 5	8691	71	29.96	68	3	93.0	K	M	3	1950	0.5	89.0	3	2000	2.0	1	0	92.5	82.7	A	K	2	2250	0.6
													2	95.0	K	M	2	3700	0.6													
													4	91.0	K	M	2	3100	0.6													
413	6	T 216A3	F	N	9.0	Y	+ 6	+ 6	10210	67	29.82	49	3	94.0	K	M	3	2900	1.0	93.0	3	2900	2.0	1				A	K	3	3000	1.0
													2	96.0	K	M	3	3000	1.0													
													4	91.0	K	M	3	2900	1.0													
414	6	T 216M5	F	N	9.0	Y	+ 2	+ 5	9175	43	29.73	32	3	89.0	K	M	4	2200	1.0	89.0	4	2200	2.0	1	N	93.0	82.1	N				
													2	89.0	K	M	4	2600	1.0													
													4	89.0	K	M	4	2200	1.0													
169	26	T F20A4	F	N	8.7	Y	+ 5	+ 5	14129	70	30.25	22	3	97.0	K	M	4	3600	1.0					1		91.4	82.3	B	K	4	2800	1.0
													2	97.0	K	P	4	2300	2.0													
													4	96.0	K	M	4	3500	1.0													

			VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION						
															MAXIMUM					PART THROTTLE								RATER		
OBS NO	LAB NO		MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWKN K	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV
415	6	T	F20A4	F	N	8.7	Y	+ 5	+ 5	19218	73	30.15	100	3	89.0	K	M	3	2500	1.0	87.0	4	1700	7.0	1	N	97.8	85.6	N				
														2	89.0	K	M	3	2700	1.0												
														4	89.0	K	M	3	2400	1.0												
449	47	T	F20A4	C	N	8.7		+ 3	+ 5	7350	70	30.15	50	3	90.0	K	M	4	2200	0.5	86.0	4	1450	6.0	1								
														2	90.0	K	M	3	2300	0.5												
														4	88.5	K	M	3	2250	0.5												
450	47	T	F20A4	C	N	8.7	Y	+ 3	+ 5	9800	70	30.02	50	3	90.0	K	M	4	2000	0.0					1								
														2	91.5	K	M	4	2150	0.0												
														4	89.5	K	M	4	2200	0.0												
451	47	T	F20A4	C	N	8.7	Y	+ 5	+ 5	8800	70	30.02	46	3	88.0	K	M	4	2100	0.2					1								
														2	89.5	K	M	4	2300	0.2												
														4	88.0	K	M	4	2200	0.2												
170	28	T	F24A4	F	N	9.0	Y	+ 5	+ 5	14958	91	29.96	118	3	88.0	K	M	4	2175	0.5	88.0	4	2150	1..5	1		91.8	82.4	N				
														2	88.0	K	M	4	2150	0.5												
														4	88.0	K	M	4	2000	0.5												
416	6	T	F24A4	F	N	9.0	Y	+ 5	+ 5	7912	72	30.00	67	3	86.0	K	M	4	2200	1.0	85.0	4	2100	2.0	1								
														2	87.0	K	M	3	2500	0.4												
														4	86.0	K	M	4	2100	1.0												
217	60	T	F24M5	F	N	9.0	Y	+ 4	+ 5	7707	70	30.20	60	3	90.0	K	M	4	1950	0.3	89.0	4	1600	2.0	1	N	92.4	82.9	N				
														2	91.0	K	M	3	1600	0.3												
														4	90.0	K	M	4	2100	0.3												
417	6	T	F24M5	F	N	9.0	Y	+ 5	+ 5	11364	64	30.28	71	3	86.0	K	M	4	2000	0.6	86.0	4	1800	1.8	1				N				
														2	87.0	K	M	4	1800	0.6												
														4	87.0	K	M	4	1900	0.6												

		VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION							
													MAXIMUM					PART THROTTLE							RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
418	6	T F28A4	F	N	8.8	Y	+10	+10	9970	46	29.90	18	3	88.0	K	M	3	3100	0.8	88.0	4	2000	3.0	1	N	92.8	84.0	N				
													2	90.0	K	M	3	3000	0.8											
													4	87.0	K	M	3	3000	0.8											
218	60	T F28M5	F	N	8.8	Y	+10	+10	9252	70	29.96	61	3	92.0	K	M	4	2250	0.4	90.0	4	2200	1.4	1	N	95.1	86.1	N				
													2	95.0	K	M	4	2100	0.4											
													4	92.0	K	M	4	2200	0.4											
419	6	X F18M5	F	N	9.3	Y	+15	+15	9310	61	30.28	47	3	89.0	K	M	4	3200	0.4					1	N	96.3	86.7	N				
													2	91.0	K	M	3	3200	0.4											
													4	88.0	K	M	4	3000	0.4											
209	7	Y TF16M5	F	N	8.0	Y			6018	70	30.21	56	3	93.0	K	M	4	2550	- 6	92.0	4	2900	- 4	1	N	96.5	86.8	N				
													2	96.0	K	M	4	2400	- 6											
													4	92.0	K	M	4	2700	- 6											
452	47	Z 215M4	C	N	9.0	Y	+ 8	+ 6	23000	70	30.19	50	3	97.5	K	P	4	2000	7.0	97.5	4	2000	7.0	1								
													2	95.5	K	M	4	3250	0.0											
													4	93.5	K	M	4	1650	0.0											
289	28	Z 220M5	F	N	8.6	Y	+ 6	+ 6	14761	70	29.41	55	3	82.0	K	M	3	1700	1.0	78.0	3	1900	3.0	1				B	K	4	1950	1.0
													2	82.0	K	M	3	1700	1.0											
													4	82.0	K	M	3	1900	1.0											
347	41	Z 220M5	C	N	8.6	Y	+ 8	+ 8	14385	74	30.08	73	3	91.0	K	M	4	2000	0.8	F				1	N			B	K	4	2000	0.8
													2	92.0	K	M	4	2000	0.8											
													4	91.0	K	M	4	2000	0.8											
420	6	Z 220M5	F	N	8.6	Y	+ 6	+ 6	14460	60	29.98	65	3	85.0	K	M	4	1800	0.4	85.0	4	1900	1.4	1	N	92.6	82.2	N				
													2	86.0	K	M	4	1900	0.4											
													4	85.0	K	M	4	1700	0.4											

		VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA									TANK FUEL INFORMATION							
													MAXIMUM					PART THROTTLE						RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
453	47	Z 220M5	C	N	8.6	Y	+10	+ 6	22000	70	29.97	50	3	85.5	K	M	3	2600	0.0	83.0	4	1650	1.0	1							
													2	85.5	K	M	3	2500	0.0											
													4	88.0	K	M	3	2800	0.0											
348	41	ZR F13M5	C	N	9.4	Y	- 5	- 5	9229	70	30.02		3	84.0	K	M	4	2850	8.0	F				1	N	92.8	83.0	N				
													2	84.5	K	M	4	2850	0.8											
													4	82.0	K	M	4	2850	0.8											
92	5	ET 224M5	F	N	8.3	Y	+ 5	+ 5	6008	70	30.10	52	3	91.0	K	M	4	1950	2.0	88.0	4	1850	4.0	1	N	96.3	86.2	N				
													2	93.0	K	M	4	1700	2.0											
													4	89.0	K	M	4	1825	2.0											
454	47	ET 224M5	C	N	8.3	Y	0	+ 3	18600	70	29.96	50	3	96.0	K	P	4	1700	8.5	96.0	4	1700	8.5	1							
													2	91.0	K	M	4	2600	0.5											
													4	90.0	K	M	4	2500	0.5											
455	47	TT F24M5	C	N	9.0	N	+ 2	+ 5	9000	70	30.20	44	3	89.0	K	M	4	1500	0.0	88.5	4	1500	5.0	1							
													2	89.0	K	M	4	1500	0.0											
													4	91.0	K	M	4	1400	0.0											
171	26	TT 224M5	F	N	9.0	Y	+12	+12	19021	84	30.02	94	3	90.0	K	M	4	1750	0.5					1	Y	92.5	82.5	N				
													2	90.0	K	M	3	1600	0.5											
													4	89.0	K	M	4	1750	0.5											
210	7	TT 224M5	F	N	9.0	N	+ 5	+ 5	7318	70	30.00	61	3	89.0	K	M	4	2300	0.5	88.0	4	2000	1.5	1	N	92.9	82.1	N				
													2	87.5	K	M	3	2700	0.5											
													4	88.0	K	M	4	2800	0.5											
500	23	HPR F25M4	F	N	9.0		+ 8	+ 8	5251	70	29.00	46	3	84.0	K	M	4	1300	0.1	F				1				N				
													2	85.0	K	M	4	1300	0.1											
													4	82.0	K	M	4	1300	0.1											

		VEHICLE DESCRIPTION							WEATHER				OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION								
														MAXIMUM						PART THROTTLE									RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
501	4	DKG 228A3	F	N	8.7	Y	+ 8	+ 8	5777	75	29.11	53	3	85.0	K	M	2	2850	1.5	F				1	N	92.6	82.9	N				
													2	86.0	K	M	2	3000	1.5													
													4	84.0	K	M	2	2850	1.5													
502	4	MA4 218A3	F	N	9.0	N	+14	+14	5318	91	29.21	75	3	90.0	K	P	3	1300	2.0	90.0	3	1300	2.0	1	N	92.2	83.3	B	K	3	1800	2.0
													2	92.0	K	P	3	1700	2.0													
													4	90.0	K	P	3	1550	2.0													
503	4	IGA 238A3	F	Y	H	8.0	Y	+15	+15	5330	78	29.04	76	3	86.0	K	M	2	1800	0.8	82.0	3	1650	3.5	1	N	91.6	83.8	N				
													2	87.0	K	M	2	1750	0.8													
													4	84.0	K	M	2	1900	0.8													
504	4	IGA 238A3	F	Y	L	8.0	Y	+15	+15	5330	78	29.04	76	3	82.0	K	M	2	2200	0.8					1								
													2	82.0	K	M	2	2350	0.8													
													4	80.0	K	M	2	2500	0.8													
505	4	GD8 F41A4	F	N		8.5	Y	+11	+11	5337	82	29.15	90	3	90.0	K	M	3	1900	0.0	89.0	4	1650	3.0	1	N	99.5	88.1	N				
													2	92.0	K	M	3	1950	0.0													
													4	90.0	K	M	4	1675	0.5													
506	4	PVSC 222A3	A	N		9.0	Y	+ 8	+ 8	5687	81	29.28	71	3	86.0	K	M	2	2600	1.0	84.0	3	2350	2.0	1	N	92.8	83.3	B	K	3	2650	1.5
													2	88.0	K	M	3	2250	1.5													
													4	84.0	K	M	3	2400	1.5													
507	7	NJP F20A3	F	N		9.3	Y	+ 6	+ 6	5927	69	30.20	62	3	94.0	K	M	3	3000	2.1	F				1	0	93.6	83.4	B	K	3	3200	2.1
													2	96.0	K	M	3	3000	2.1													
													4	90.0	K	M	3	3050	2.1													
508	7	NJP F20M5	F	N		9.3	N	+ 5	+ 6	5688	70	30.20	64	3	90.0	K	M	4	1950	0.4	87.0	4	2750	2.0	1	N	91.8	82.0	N				
													2	92.0	K	M	4	2250	0.4													
													4	89.0	K	M	4	2500	0.4													

		VEHICLE DESCRIPTION								WEATHER				OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
								SPARK ADVANCE								MAXIMUM					PART THROTTLE							RATER								
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK NK	OCT NO RES	OCT NO MOT	NINT	NTYPE	GEAR	RPM	MV			
509	7	IAR F25A3	F	N	9.0	Y	+12	+ 8	5912	67	30.52	48	3	93.0	K	M	3	2150	1.2	92.0	3	1950	2.5	1	N	92.0	82.8	B	K	2	2950	0.9			
													2	96.0	K	M	2	3100	1.4															
													4	89.0	K	M	3	2150	1.6															
510	7	NTSB 228M5	F	N	8.5	Y	+ 6	+ 8	4845	74	30.10	64	3	92.0	K	M	4	1700	0.6	92.0	4	1400	2.5	1	Y	91.9	82.5	B	K	4	1900	0.6			
													2	92.0	K	M	4	1700	0.6															
													4	91.0	K	M	4	1700	0.6															
511	60	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	5923	70	30.42	64	3	95.0	K	M	3	2150	1.0	94.0	3	2100	2.0	1	N	92.0	83.0	A	K	3	2450	1.0			
													2	98.0	K	M	3	2200	1.0															
													4	93.0	K	M	3	2150	1.0															
512	60	T 215A3	F	N	9.0	Y	+ 5	+ 5	5844	71	30.44	58	3	92.0	K	M	3	3050	1.3	90.0	3	3000	2.3	1	N	93.2	83.0	B	K	2	3100	1.6			
													2	94.0	K	M	3	3100	1.3															
													4	90.0	K	M	3	3500	1.3															
513	32	SHF F50A4	F	N	8.4	Y	+10	+10	5137	85	29.34	66	3	90.0	K	M	2	2500	1.3	88.0	4	1550	4.0	1	N				N						
													2	91.0	K	M	2	2500	1.3															
													4	89.0	K	M	3	1800	1.8															
514	44	KED F22A3	F	N	9.0	Y	+ 6	+ 8	3594	73	29.79	48	3	89.0	K	M	3	2350	0.6					1					N						
													2	90.0	K	M	3	2200	0.6															
													4	86.0	K	M	3	2400	0.6															
515	46	NVMM 474A3	F	N	8.0	Y	+ 4	+ 4	5360	74	29.70	64	3	91.5	K	M	2	3100	1.5					1				B	K	2	2800	1.5			
													2	93.5	K	M	2	2900	1.5															
													4	88.0	K	M	3	2300	1.5															
516	40	OAS TF16M5	F	N	8.0	N	+10	+10	5380		30.07		3	91.0	K	M	4	3500	- 8	F				1					N						
													2	91.5	K	M	4	3000	- 8															
													4	93.0	K	M	4	3500	- 8															

		VEHICLE DESCRIPTION									WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION					
							SPARK ADVANCE							MAXIMUM					PART THROTTLE							RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	NTYPE	THR	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	NINT	NTYPE	GEAR	RPM	MV
517	40	X F18M5	F	N	9.3	Y	+15	+15	1620	52	30.00		3	86.0	K	M	4	2500	1.0	F				1			N				
													2	86.0	K	M	4	2750	1.0												
													4	85.0	K	M	4	2750	1.0												
518	31	KED F22A3	F	N	9.0	Y	+13	+12	3162	24	28.85	83	3	88.0	K	M	3	3700	1.3	86.0	3	3800	6.0	1							
													2																		
													4																		
519	31	KGE TF22A3	F	Y	H	8.1	Y	+10	+10	3903	32	28.78	68	3	92.0	K	M	3	3100	-18					1							
													2																		
													4																		
520	31	KGE TF22A3	F	Y	L	8.1	Y	+10	+10	3903	32	28.78	68	3	88.0	K	M	3	3700	-18					1							
													2																		
													4																		

APPENDIX F

PROCEDURES FOR PLOTTING
OCTANE NUMBER REQUIREMENT DISTRIBUTION DATA

WEIGHTED VEHICLE/CAR POPULATIONS

Weighting factors for each vehicle model were developed from information supplied by the US vehicle manufacturers and from information published (Ward's Automotive Reports) for imported vehicles. These weight factors were proportioned to the relative production and/or sales volumes of the vehicles tested.

For any vehicle having octane requirements lower (L) than the lowest octane number fuel available within a given fuel series, a number 0.5 Research/0.4 Motor lower was assigned. Similarly, for any vehicle having octane requirements higher (H) than the highest octane fuel available within a given fuel series, a number 0.5 Research/0.4 Motor higher was assigned.

The weighting factors of each vehicle model were divided by the number of vehicles tested to calculate individual vehicle weight factors. The octane requirements for each vehicle were then arranged in increasing order with the appropriate individual weighting factors. The percent of vehicles at each octane requirement level represents the summation of all vehicle weighting factors before that level, plus one-half the sum of the weighting factors at that level. The individual vehicle weighting factors are adjusted so that the summation of all weighting factors is 100.00 for any vehicle population of interest. The midpoint percentiles are plotted versus octane number requirement on arithmetic probability paper and a distribution curve is drawn through the points. These distributions are then plotted point to point on Cartesian coordinates for figures shown in the survey report.

SELECT CAR MODELS

For individual car models, the octane number requirement distribution curves were plotted by the "Z" method as described in "Statistical Estimation of the Gasoline Octane Number Requirement of New Model Automobiles," C. S. Brinegar and R. R. Miller, Technometrics, Vol. 2, No. 1, February 1960.

The procedure is as follows:

For any cars having octane requirements lower (L) than the lowest octane number fuel available within a given fuel level, a number 1.0 Research/0.7 Motor lower was assigned. Similarly, for individual cars having octane requirements higher (H) than the highest octane fuel available within a given fuel series, a number 1.5 Research/1.1 Motor higher was assigned.

Using all observed and estimated octane number values, calculate the mean ($\bar{X}$) and the standard deviation (s) from the data for each car model.

$$s = \left(\frac{1}{n-1} \cdot \Sigma (X_i - \bar{X})^2\right)^{\frac{1}{2}}$$

Where X_i = Octane number requirement of i^{th} car of a given model

n = Number of cars of that model.

Estimate octane number requirements at the percentiles of interest from octane number requirement distribution data by

$$O.N. = \bar{X} + ks$$

Where k is selected from normal distribution tables.

Values of k used to calculate percentiles in this report are:

Percentile	k
5	-1.645
10	-1.282
20	-0.842
30	-0.524
40	-0.253
50	0
60	+0.253
70	+0.524
80	+0.842
90	+1.282
95	+1.645

The requirements were arranged in increasing order and plotted on arithmetic probability paper; the percent satisfaction for any car is calculated by the following relationship:

$$\text{Percent satisfied: } i \quad \text{car} = \frac{(i-0.5)}{N} \quad 100$$

Where N is the total number of cars tested for a given fuel and i is an integer having increasing values from 1 to N.

For this report, straight-line octane number requirement versus percent car satisfaction curves for the select models were drawn via a two-point plot of the mean and standard deviation. From inspection of the curves, revised L and H values may be indicated. An alternate method to obtain the octane number requirement/percent satisfied curves is to fair a curve through plotted points.

APPENDIX G

CONFIDENCE LIMITS OF
OCTANE NUMBER REQUIREMENT DISTRIBUTIONS

CONFIDENCE LIMITS OF OCTANE NUMBER REQUIREMENT DISTRIBUTIONS

Octane number requirements of vehicles presented in this Survey are determined at the levels that satisfy certain percentages of specific vehicle populations. In many cases, the recorded octane number requirement is followed by a plus and minus limit, referred to as the confidence interval. These limits are expected to bound the true requirement of the population represented by the test vehicles 95 percent of the time in replicate testing of the same number of test vehicles.

At the 50 percent satisfaction level, the 95 percent confidence interval is calculated as follows:

$$CI = \pm ts\ (n)^{\frac{1}{2}}$$

where t = Students t at the proper number of degrees of freedom*

s = Standard deviation, calculated directly from the data or estimated as the difference between the 84.16th and 50th percentiles (assuming normal distribution)

n = Number of vehicles in population.

At other satisfaction levels:

$$CI = \pm ts\ \left(1/n + k^2/[2(n-1)]\right)^{\frac{1}{2}}$$

At the 90 percent satisfaction level, k = 1.2817. For other satisfaction levels, appropriate values for k may be found in the standard statistical tables.

Degrees of Freedom**	t	Degrees of Freedom**	t
1	12.706	18	2.101
2	4.393	19	2.093
3	3.182	20	2.086
4	2.776	21	2.080
5	2.571	22	2.074
6	2.447	23	2.069
7	2.365	24	2.064
8	2.306	25	2.060
9	2.262	26	2.056
10	2.228	27	2.052
11	2.201	28	2.048
12	2.179	29	2.045
13	2.160	30	2.042
14	2.145	40	2.021
15	2.131	60	2.000
16	2.120	120	1.980
17	2.110	∞	1.960

* Distribution of t for probability = 0.05.
** Degrees of Freedom = (n-1).

TABLE G-I

95% CONFIDENCE LIMITS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS

1984 Weighted Population Groups

Population	Fuel	n	t	Std. Dev. (s) RON	Std. Dev. (s) MON	95% Confidence Limits RON 50%	RON 90%	MON 50%	MON 90%
US and Imported Vehicles									
Includes Knock Sensor	PR	402	1.966	3.07	3.07	0.30	0.41	0.30	0.41
Maximum (High Borderline) Requirements	FBRU	407	1.966	4.03	2.53	0.39	0.53	0.25	0.33
	FBRSU	403	1.966	4.12	2.69	0.40	0.54	0.26	0.36
Includes Knock Sensor	PR	397	1.966	3.18	3.18	0.31	0.42	0.31	0.42
Minimum (Low Borderline) Requirements	FBRU	406	1.966	4.08	2.58	0.40	0.54	0.25	0.34
	FBRSU	403	1.966	4.22	2.76	0.41	0.56	0.27	0.36
US and Imported Cars									
Includes Knock Sensor	PR	368	1.967	3.03	3.03	0.31	0.42	0.31	0.42
Maximum (High Borderline) Requirements	FBRU	373	1.966	3.71	2.31	0.38	0.51	0.23	0.32
	FBRSU	369	1.966	3.83	2.49	0.39	0.53	0.25	0.34
Includes Knock Sensor	PR	363	1.967	3.14	3.14	0.32	0.44	0.32	0.44
Minimum (Low Borderline) Requirements	FBRU	373	1.966	3.71	2.30	0.38	0.51	0.23	0.32
	FBRSU	369	1.966	3.87	2.52	0.40	0.53	0.26	0.35

TABLE G-I
(Continued)

95% CONFIDENCE LIMITS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS

1984 Weighted Population Groups

Population	Fuel	n	t	Std. Dev. (s) RON	Std. Dev. (s) MON	95% Confidence Limits RON 50%	95% Confidence Limits RON 90%	95% Confidence Limits MON 50%	95% Confidence Limits MON 90%
US Vehicles									
Includes Knock Sensor Maximum (High Borderline) Requirements	PR	340	1.967	2.90	2.90	0.31	0.42	0.31	0.42
	FBRU	345	1.967	3.79	2.36	0.40	0.54	0.25	0.34
	FBRSU	341	1.967	3.88	2.52	0.41	0.56	0.27	0.36
Includes Knock Sensor Minimum (Low Borderline) Requirements	PR	335	1.967	3.06	3.06	0.33	0.44	0.33	0.44
	FBRU	344	1.967	3.88	2.42	0.41	0.56	0.26	0.35
	FBRSU	341	1.967	4.00	2.61	0.43	0.58	0.28	0.38
US Cars									
Includes Knock Sensor Maximum (High Borderline) Requirements	PR	311	1.968	2.74	2.74	0.31	0.41	0.31	0.41
	FBRU	316	1.968	3.41	2.12	0.38	0.51	0.23	0.32
	FBRSU	312	1.968	3.51	2.31	0.39	0.53	0.26	0.35
Includes Knock Sensor Minimum (Low Borderline) Requirements	PR	306	1.968	2.87	2.87	0.32	0.44	0.32	0.44
	FBRU	316	1.968	3.42	2.10	0.38	0.51	0.23	0.31
	FBRSU	312	1.968	3.52	2.28	0.39	0.53	0.25	0.34

TABLE G-I
(Continued)

95% CONFIDENCE LIMITS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS

1984 Weighted Population Groups

Population	Fuel	n	t	Std. Dev. (s) RON	Std. Dev. (s) MON	95% Confidence Limits RON 50%	95% Confidence Limits RON 90%	95% Confidence Limits MON 50%	95% Confidence Limits MON 90%
Imported Vehicles									
Includes Knock Sensor	PR	62	1.999	3.30	3.30	0.84	1.13	0.84	1.13
Maximum (High Border-	FBRU	62	1.999	4.03	2.62	1.02	1.39	0.67	0.90
line) Requirements*	FBRSU	62	1.999	5.26	3.44	1.33	1.81	0.87	1.18
Knock Sensor Vehicles Only									
Maximum (High Borderline	PR	48	2.011	2.72	2.72	0.79	1.07	0.79	1.07
Requirements	FBRU	48	2.011	3.58	2.22	1.04	1.41	0.64	0.87
	FBRSU	48	2.011	4.64	3.06	1.35	1.83	0.89	1.20
Minimum (Low Borderline	PR	43	2.018	6.07	6.07	1.87	2.53	1.87	2.53
Requirements	FBRU	47	2.012	6.13	4.39	1.80	2.44	1.29	1.75
	FBRSU	48	2.011	5.98	3.99	1.74	2.35	1.16	1.57

* All statistics the same for ease, including knock sensor minimum (low borderline) requirements.

TABLE G-II

95% CONFIDENCE LIMITS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS

1984 Select Models

Model	Fuel	n	t	Std. Dev. (s) RON	Std. Dev. (s) MON	95% Confidence Limits RON 50%	RON 90%	MON 50%	MON 90%
IAE 230A3/LAE 230A3	PR	14	2.160	3.847	3.847	2.22	3.05	2.22	3.05
Knock Sensor, Maximum	FBRU	14	2.160	3.587	2.508	2.07	2.84	1.45	1.99
(High)	FBRSU	14	2.160	3.525	2.371	2.03	2.79	1.37	1.88
IAE 230A3/LAE 230A3	PR	12	2.201	1.977	1.977	1.26	1.73	1.26	1.73
Knock Sensor, Minimum	FBRU	14	2.160	3.249	2.413	1.88	2.57	1.39	1.91
(Low)	FBRSU	14	2.160	3.009	2.068	1.74	2.38	1.19	1.64
NAR F25A3/HAR F25A3/	PR	12	2.201	3.055	3.055	1.94	2.67	1.94	2.67
IAR F25A3/LAR F25A3	FBRU	12	2.201	2.844	1.837	1.81	2.49	1.17	1.61
	FBRSU	12	2.201	3.118	2.097	1.98	2.73	1.33	1.83
NAX 228A3/HAX 228A3	PR	13	2.179	3.017	3.017	1.82	2.51	1.82	2.51
	FBRU	13	2.179	2.463	1.599	1.49	2.05	0.97	1.33
	FBRSU	13	2.179	2.326	1.511	1.41	1.93	0.91	1.26
NBH 450A4/HBH 450A4	PR	12	2.201	2.740	2.740	1.74	2.40	1.74	2.40
	FBRU	12	2.201	1.865	1.187	1.18	1.63	0.75	1.04
	FBRSU	12	2.201	2.158	1.410	1.37	1.89	0.90	1.23

TABLE G-II
(Continued)

95% CONFIDENCE LIMITS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS

1984 Select Models

Model	Fuel	n	t	Std. Dev. (s) RON	Std. Dev. (s) MON	95% Confidence Limits RON 50%	95% Confidence Limits RON 90%	95% Confidence Limits MON 50%	95% Confidence Limits MON 90%
NJP F20A3/IJP F20A3/ LJP F20A3	PR	15	2.145	3.840	3.840	2.13	2.92	2.13	2.92
	FBRU	16	2.131	4.646	3.151	2.48	3.39	1.68	2.30
	FBRSU	16	2.131	4.839	3.275	2.58	3.53	1.74	2.39
OCR 123A3/MCR 123A3	PR	25	2.064	3.250	3.250	1.34	1.83	1.34	1.83
	FBRU	25	2.064	3.500	2.401	1.44	1.97	0.99	1.35
	FBRSU	25	2.064	4.049	2.757	1.67	2.28	1.14	1.55
KED F22A3/DED F22A3	PR	13	2.179	2.483	2.483	1.50	2.06	1.50	2.06
	FBRU	13	2.179	3.000	1.930	1.81	2.49	1.17	1.60
	FBRSU	13	2.179	3.226	2.123	1.95	2.68	1.28	1.76
PKC 222A3/KKC 222A3/ DKC 222A3	PR	13	2.179	2.750	2.750	1.66	2.28	1.66	2.28
	FBRU	14	2.160	3.776	2.562	2.18	2.99	1.48	2.03
	FBRSU	13	2.179	3.958	2.606	2.39	3.29	1.57	2.17

APPENDIX H

MAXIMUM OCTANE NUMER REQUIREMENTS OF SELECT MODELS

TABLE H-I

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

MODEL: KED F22A3/DED F22A3

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	85.4	86.6	80.4	83.5	87.6	79.1	83.3
10	86.3	87.7	81.1	84.4	88.8	79.8	84.3
20	87.4	89.0	81.9	85.5	90.2	80.8	85.5
30	88.2	89.9	82.5	86.2	91.2	81.5	86.3
40	88.9	90.7	83.1	86.9	92.1	82.0	87.1
50	89.5	91.5	83.6	87.5	92.9	82.6	87.7
60	90.1	92.3	84.0	88.2	93.7	83.1	88.4
70	90.8	93.1	84.6	88.8	94.6	83.7	89.1
80	91.6	94.0	85.2	89.6	95.6	84.4	90.0
90	92.7	95.3	86.0	90.7	97.1	85.3	91.2
95	93.6	96.4	86.7	91.6	98.2	86.1	92.1
N	13	----------13----------			----------13----------		
Mean	89.500	91.500	83.558	87.529	92.923	82.569	87.746
Std. Dev.	2.483	3.000	1.930	2.465	3.226	2.123	2.675

TABLE H-II

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

MODEL: PKC 222A3/KKC 222A3/DKC 222A3

Percent Satisfied	PRF ON	FBRU			FBRSU		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
5	82.8	83.5	78.2	80.8	85.0	77.3	81.2
10	83.8	84.9	79.1	82.0	86.4	78.3	82.3
20	85.0	86.6	80.2	83.4	88.2	79.4	83.8
30	85.9	87.8	81.0	84.4	89.4	80.2	84.8
40	86.6	88.8	81.7	85.3	90.5	81.0	85.7
50	87.3	89.8	82.4	86.1	91.5	81.6	86.6
60	88.0	90.7	83.0	86.9	92.5	82.3	87.4
70	88.7	91.7	83.7	87.7	93.6	83.0	88.3
80	89.6	92.9	84.5	88.7	94.8	83.8	89.3
90	90.8	94.6	85.7	90.1	96.6	85.0	90.8
95	91.8	96.0	86.6	91.3	98.0	85.9	92.0
N	13	----------14----------			----------13----------		
Mean	87.308	89.750	82.368	86.059	91.500	81.612	86.556
Std. Dev.	2.750	3.776	2.562	3.168	3.958	2.606	3.282

TABLE H-III

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

MODEL: OCR 123A3/MCR 123A3

Percent Satisfied	PRF ON	FBRU			FBRSU		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
5	83.5	84.6	78.8	81.7	84.3	76.7	80.5
10	84.7	85.8	79.7	82.8	85.8	77.7	81.8
20	86.1	87.4	80.8	84.1	87.6	79.0	83.3
30	87.1	88.5	81.5	85.0	88.8	79.8	84.3
40	88.0	89.4	82.2	85.8	89.9	80.6	85.3
50	88.8	90.3	82.8	86.6	91.0	81.3	86.1
60	89.6	91.2	83.4	87.3	92.0	82.0	87.0
70	90.5	92.2	84.0	88.1	93.1	82.7	87.9
80	91.6	93.3	84.8	89.0	94.4	83.6	89.0
90	93.0	94.8	85.9	90.3	96.1	84.8	90.5
95	94.2	96.1	86.7	91.4	97.6	85.8	91.7
N	25	----------25----------			----------25----------		
Mean	88.820	90.320	82.786	86.553	90.960	81.274	86.117
Std. Dev.	3.250	3.500	2.401	2.949	4.049	2.757	3.403

TABLE H-IVA

MAXIMUM (HIGH BORDERLINE) OCTANE NUMBER REQUIREMENTS - KNOCK-SENSOR SELECT MODEL

1984 MODEL: IAE 230A3/LAE 230A3

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	79.5	82.1	77.1	79.6	83.7	76.4	80.0
10	80.9	83.4	78.0	80.7	85.0	77.3	81.1
20	82.5	85.0	79.1	82.1	86.5	78.3	82.4
30	83.8	86.2	79.9	83.0	87.7	79.1	83.4
40	84.8	87.1	80.6	83.8	88.6	79.7	84.2
50	85.8	88.0	81.2	84.6	89.5	80.3	84.9
60	86.8	88.9	81.8	85.4	90.4	80.9	85.6
70	87.8	89.9	82.5	86.2	91.3	81.5	86.4
80	89.0	91.1	83.3	87.2	92.5	82.3	87.4
90	90.7	92.6	84.4	88.5	94.0	83.3	88.7
95	92.1	93.9	85.3	89.6	95.3	84.2	89.7
N	14	----------14----------			----------14----------		
Mean	85.786	88.036	81.196	84.616	89.500	80.293	84.896
Std. Dev.	3.847	3.587	2.508	3.047	3.525	2.371	2.947

TABLE H-IVB

MINIMUM (LOW BORDERLINE) OCTANE NUMBER REQUIREMENTS - KNOCK-SENSOR SELECT MODEL

1984 MODEL: IAE 230A3/LAE 230A3

Percent Satisfied	PRF ON	FBRU			FBRSU		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
5	81.2	80.2	75.5	77.8	81.9	75.1	78.5
10	82.0	81.4	76.4	78.9	83.0	75.9	79.4
20	82.8	82.8	77.4	80.1	84.3	76.8	80.6
30	83.5	83.8	78.2	81.0	85.3	77.4	81.4
40	84.0	84.7	78.8	81.8	86.1	78.0	82.0
50	84.5	85.5	79.5	82.5	86.9	78.5	82.7
60	85.0	86.4	80.1	83.2	87.6	79.0	83.3
70	85.5	87.2	80.7	84.0	88.4	79.6	84.0
80	86.2	88.3	81.5	84.9	89.4	80.3	84.8
90	87.0	89.7	82.5	86.1	90.7	81.2	85.9
95	87.8	90.9	83.4	87.2	91.8	81.9	86.9
N	12	----------14----------			----------14----------		
Mean	84.500	85.536	79.454	82.495	86.857	78.514	82.686
Std. Dev.	1.977	3.249	2.413	2.831	3.009	2.068	2.538

TABLE H-V

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

MODEL: NAR F25A3/HAR F25A3/IAR F25A3/LAR F25A3

Percent Satisfied	PRF ON	FBRU			FBRSU		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
5	84.3	87.8	81.2	84.5	88.5	79.6	84.0
10	85.4	88.9	81.9	85.4	89.6	80.3	85.0
20	86.8	90.1	82.7	86.4	91.0	81.3	86.1
30	87.7	91.0	83.3	87.1	91.9	81.9	86.9
40	88.6	91.8	83.8	87.8	92.8	82.5	87.6
50	89.3	92.5	84.2	88.4	93.6	83.0	88.3
60	90.1	93.2	84.7	89.0	94.4	83.5	89.0
70	90.9	94.0	85.2	89.6	95.2	84.1	89.7
80	91.9	94.9	85.8	90.3	96.2	84.8	90.5
90	93.2	96.1	86.6	91.4	97.6	85.7	91.6
95	94.4	97.2	87.2	92.2	98.7	86.5	92.6
N	12	----------12----------			----------12----------		
Mean	89.333	92.500	84.225	88.363	93.583	83.017	88.300
Std. Dev.	3.055	2.844	1.837	2.340	3.118	2.097	2.607

TABLE H-VI

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

MODEL: NAX 228A3/HAX 228A3

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	83.7	87.6	81.1	84.3	89.3	80.1	84.7
10	84.8	88.5	81.6	85.1	90.1	80.7	85.4
20	86.1	89.6	82.3	86.0	91.1	81.4	86.2
30	87.1	90.4	82.8	86.6	91.9	81.8	86.8
40	87.9	91.1	83.3	87.2	92.5	82.2	87.4
50	88.7	91.7	83.7	87.7	93.1	82.6	87.9
60	89.4	92.3	84.1	88.2	93.7	83.0	88.3
70	90.2	93.0	84.5	88.8	94.3	83.4	88.9
80	91.2	93.8	85.0	89.4	95.0	83.9	89.5
90	92.5	94.8	85.7	90.3	96.1	84.6	90.3
95	93.6	95.7	86.3	91.0	96.9	85.1	91.0
N	13	----------13----------			----------13----------		
Mean	88.654	91.692	83.685	87.688	93.077	82.631	87.854
Std. Dev.	3.017	2.463	1.599	2.031	2.326	1.511	1.918

TABLE H-VII

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

MODEL: NBH 450A4/HBH 450A4

Percent Satisfied	PRF ON	FBRU			FBRSU		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
5	85.9	90.7	83.1	86.9	90.7	81.1	85.9
10	86.9	91.4	83.5	87.4	91.5	81.6	86.6
20	88.1	92.2	84.0	88.1	92.5	82.3	87.4
30	88.9	92.8	84.4	88.6	93.2	82.7	87.9
40	89.7	93.3	84.7	89.0	93.7	83.1	88.4
50	90.4	93.8	85.0	89.4	94.3	83.4	88.9
60	91.1	94.2	85.3	89.8	94.8	83.8	89.3
70	91.8	94.7	85.7	90.2	95.4	84.2	89.8
80	92.7	95.3	86.0	90.7	96.1	84.6	90.4
90	93.9	96.1	86.6	91.4	97.1	85.3	91.4
95	94.9	96.8	87.0	91.9	97.8	85.8	91.8
N	12	----------12----------			----------12----------		
Mean	90.375	93.750	85.042	89.396	94.292	83.446	88.869
Std. Dev.	2.740	1.865	1.187	1.525	2.158	1.410	1.784

TABLE H-VIII

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1984 SELECT MODELS

MODEL: NJP F20A3/IJP F20A3/ LJP F20A3

Percent Satisfied	PRF ON	FBRU			FBRSU		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
5	83.9	84.9	79.1	82.0	85.9	77.8	81.9
10	85.3	86.6	80.2	83.4	87.7	79.0	83.3
20	87.0	88.6	81.6	85.1	89.8	80.5	85.1
30	88.2	90.1	82.6	86.3	91.3	81.5	86.4
40	89.3	91.4	83.5	87.4	92.7	82.4	87.5
50	90.2	92.5	84.3	88.4	93.9	83.2	88.5
60	91.2	93.7	85.0	89.4	95.1	84.0	89.6
70	92.2	95.0	85.9	90.4	96.4	84.9	90.7
80	93.5	96.4	86.9	91.7	97.9	86.0	92.0
90	95.2	98.5	88.3	93.4	100.1	87.4	93.7
95	96.6	100.2	89.4	94.8	101.8	88.6	95.2
N	15	----------16----------			----------16----------		
Mean	90.233	92.531	84.253	88.392	93.875	83.219	88.547
Std. Dev.	3.840	4.646	3.151	3.897	4.839	3.275	4.056

APPENDIX I

SPEED RANGE DATA

TABLE I-I

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK ADV AS RCD	SPK ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
32	8	BA7 F17A3	F	N	8.2	Y	+ 3	+ 3	14283	75	29.82	76									84.0	83.0	81.5	80.5
135	26	BA8 F18M5	F	N	8.5	Y	+ 6	+ 6	9291	80	30.01	78				87.5	88.0	88.0	88.0	87.5	87.0	84.0		
66	5	DED F22A3	F	N	9.0	Y	+ 6	+ 6	11096	70	30.10	55			94.0	93.5	92.5	92.0	91.0	90.5	90.0	89.5	89.5	89.0
173	4	DED F22A3	F	N	9.0	Y	+ 6	+ 6	6686	82	29.36	45				85.5	88.0	88.5	88.0	87.5	87.0	86.5	85.5	85.0
188	7	DED F22A3	F	N	9.0	Y	+10	+10	13750	68	30.10	54					86.0	88.5	90.5	90.1	89.5	88.4	87.4	86.1
291	46	DED F22A3	F	N	9.0	Y	+ 6	+ 6	15553	76	29.24	80						86.5	86.8					
325	41	DGD F22A3	C	N	9.0	Y	+ 6	+ 6	10955	68	30.21	66							85.0	86.0	87.0	87.0	87.0	86.0
36	8	DKD F22A3	F	N	9.0	Y	+ 6	+ 6	16168	78	29.64	40					89.0	88.0	87.0	86.0				
326	41	DKD F22A3	C	N	9.0	Y	+ 6	+ 6	13007	74	30.07	51					89.0	89.5	89.5	90.0	90.0	90.0	89.5	89.0
37	8	DKG 226A3	F	N	8.7	Y	+ 7	+ 7	22179	75	30.04	67							81.0	83.5	84.0	81.5	80.0	78.5
61	8	GD8 F41A4	F	N	8.5	Y	+10	+10	13317	80	29.93	41					84.0	82.0	80.0	78.5				
161	26	GD8 F41A4	F	N	8.5	Y	+10	+10	8168	91	30.00	124			88.0	88.0	88.0	87.5	87.5	87.5	87.5	87.0	87.0	87.0
306	46	GD8 F41A4	F	N	8.5	Y	+10	+10	19950	75	29.45	82				84.2	84.5							
84	5	GK8 F41A4	F	N	8.5	Y	+10	+10	7206	68	30.45	55			82.5	84.5	87.0	86.5	85.5	84.0	83.0	82.5	82.0	82.0
150	26	HAR F25A3	F	N	9.0	Y	+ 8	+ 8	6003	80	29.94	112		93.0	93.0	91.0	88.5	87.5	87.0	86.0	84.5	82.5	80.0	
195	7	HAR F25A3	F	N	9.0	Y	+ 8	+ 8	10022	70	30.40	66					80.0	83.5	87.5	88.9	87.2	85.2	83.2	81.4
215	60	HAR F25A3	F	N	9.0	Y	+ 8	+ 8	11354	68	30.30	56				83.6	87.4	85.4	83.4	85.5	86.5	84.4	82.8	81.3
10	29	HAX 228A3	F	N	8.5	Y	+10	+10	13622	70	30.02	62						87.0	88.0	87.0	85.5	84.5		
196	7	HAX 228A3	F	N	8.5	Y	+10	+10	6574	80	30.30	68		83.0	86.0	87.4	86.2	84.6	86.0	85.8	84.7	83.4	82.2	81.0
297	48	HAX 228A3	F	N	8.5	Y	+ 8	+10	9994	75	29.20	96				83.5	84.0	84.0	83.0					
336	41	HF1 228A4	C	N	8.5	Y	+10	+10	16875	72	30.02	52	91.0	92.0	91.5	91.0	90.0	89.0	88.0	86.5	85.0	83.5		
74	5	HGA 238A3	F	Y	8.0	Y	+15	+15	8334	75	29.93	66				81.5	78.0							

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK RCD	ADV TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
12	29	HGH 450A3	F	N	8.6	Y	+ 6	+ 6	6369	70	30.22	62			91.0	92.0	90.5	90.0	94.0	88.0				
151	28	HGH 450A3	F	N	8.6	Y	+ 6	+ 6	7205	75	30.00	77		87.0	87.0	87.0	87.0	86.5	86.0	85.0	84.5	83.0		
11	29	HGH 450A4	F	N	8.6	Y	+ 6	+ 6	7287	70	30.09	58				88.0	87.0	86.0	85.0	84.5	83.5	82.0		
13	29	HJO F18A3	F	N	9.0	Y	+ 8	+ 8	19176	70	29.93	61								87.5	87.0	85.5	84.0	
49	8	HJO F18A3	F	N	9.0	Y	+ 8	+ 8	11533	75	29.84	76									82.0	82.0	81.5	80.0
298	46	HJO F18A3	F	N	9.0	Y	+ 8	+ 8	14089	75	29.30	92							80.0	80.0	79.0			
337	41	HJO F18A3	C	N	9.0	Y	+ 8	+ 8	20585	72	30.07	87			88.0	88.0	88.0	88.0	87.5	87.5	87.0	87.0	86.5	86.0
14	29	HPR F25A3	F	N	9.0	Y	+ 8	+ 8	7740	70	30.05	80						87.5	88.5	84.0	87.0	85.0		
152	28	HPR F25A3	F	N	9.0	Y	+ 8	+ 8	16801	89	29.97	10					80.0	81.5	82.0					
315	40	HPR F25A3	F	N	9.0	N	+ 8	+ 8	7750	61	30.02	67							87.0	85.5				
76	5	HPR F25M4	F	N	9.0	N	+ 8	+ 8	6078	73	30.40	56	88.0	91.0	90.0	90.0	89.5	89.5	89.0	88.5	88.0	87.0	86.5	86.0
131	62	HPR F25M4	F	N	9.0	Y	+11	+ 8	13156	68	30.01	60				85.0	88.5	88.8	87.8	86.0	84.9	83.8	83.0	82.0
153	28	HPR F25M4	F	N	9.0	Y	+ 8	+ 8	10836	84	30.04	111			87.0	87.0	87.0	86.5	86.0	85.5	84.5	82.0		
177	4	HPR F25M4	F	N	9.0	N	+ 9	+ 9	19910	78	29.30	67		88.0	88.0	88.0	87.5	87.0	86.0	85.5	85.0	84.5	84.0	84.0
197	7	HPR F25M4	F	N	9.0	Y	+ 5	+ 8	18782	70	30.24	61					86.0	88.0	90.2	92.4	91.8	89.8	88.0	86.5
299	46	HPR F25M4	F	N	9.0	Y	+ 8	+ 8	8886	74	29.56	74			86.0	87.0	86.0	85.5	85.0	84.3				
50	8	HTC 216A3	F	N	9.0	Y	+ 8	+ 8	7146	75	30.13	82					88.0	87.5	87.0	86.0				
15	29	IAE 230A3	F	N	8.4	Y	+15	+15	6951	70	31.25	62				86.0	87.0	86.5	85.5	84.0				
51	8	IAE 230A3	F	Y	8.4	Y	+15	+15	16481	75	30.03	76					80.0	80.5	78.0	76.5				
266	28	IAE 230A3	F	Y	8.4	Y	+15	+15	8987	70	29.16	55				83.7	86.0	85.3	82.5					
268	28	IAE 230A3	F	Y	8.4	Y	+15	+15	9847	70	29.29	50					87.0	87.0	84.0					
302	46	IAE 230A3	F	Y	8.4	Y	+12	+12	8722	76	29.35	90							80.0	82.0	81.5			

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK ADV AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
434	47	IAE 230A3	C	Y	8.4	Y	+14	+15	6400	70	29.65	38			80.0	82.0	81.5	80.5	79.0	78.0	77.5	77.0	76.5	76.0
77	5	IAR F25A3	F	N	9.0	Y	+ 8	+ 8	16630	70	30.20	52			96.0	94.0	92.5	91.5	91.0	90.5	90.0	90.0	89.5	89.0
338	41	IAR F25A3	C	N	9.0	Y	+ 6	+ 6	18333	79	30.02	80			89.0	89.0	88.5	84.0	87.0	85.5	84.0	82.5	81.0	
53	8	IBY 450A3	F	N	8.0	Y	+20	+20	8583	80	29.96	45				85.5	88.0	85.0						
154	26	IBY 450A3	F	N	8.0	Y	+20	+20	15950	81	30.10	93			82.5	84.5	85.0	84.0	83.5	82.0	81.0	79.5	78.0	
198	7	IBY 450A3	F	N	8.0	Y	+20	+20	6134	70	30.02	66		81.6	84.0	86.5	88.6	87.0	85.2	83.5	82.0			
18	29	IBY 450A4	F	N	8.0	Y	+20	+20	6592	70	31.25	61				86.5	86.5	86.0	85.5	84.5	83.5	82.0		
17	29	IBY 450A4	F	N	8.0	Y	+20	+20	8311	70	30.09	60				89.5	90.0	88.5	89.0	86.0	84.5			
78	5	IBY 450A4	F	N	8.0	Y	+20	+20	6112	70	30.45	55			88.0	89.0	90.0	88.5	87.5	87.0	87.0	86.5	85.0	
339	41	IBY 450A4	C	N	8.0	Y	+20	+20	6902	70	30.08	26	90.0	90.0	90.0	89.5	89.0	88.5	88.0	87.5	87.0	86.0	85.0	
436	47	IDY 450A4	C	N	8.0	Y	+20	+20	14800	70	29.95	38		90.0	89.5	88.5	87.5	87.0	86.5	86.0				
270	28	IDY 450A4	F	N	8.0	Y	+20	+20	15850	70	29.52	55		84.5	87.0	87.5	85.0	83.0	82.5	82.0	82.0			
54	8	IGA 238A3	F	N	8.0	Y	+15	+15	16966	75	30.15	45					80.0	77.5						
55	8	IGA 238A3	F	N	8.0	Y	+15	+15	6919	76	29.86	61					78.0	77.0						
132	62	IGA 238A3	F	N	8.0	Y	+15	+15	11196	67	30.10	54		86.0	89.0	91.5	92.5	91.0	88.8	86.3	84.0			
155	26	IGA 238A3	F	Y	8.0	Y	+15	+15	8025	91	29.94	118			87.0	88.0	88.0	87.0	85.5	83.0	80.0	L		
157	28	IGA 238A3	F	Y	8.0	Y	+15	+15	10816	82	29.96	114	85.0	86.5	87.0	87.0	87.0	86.5	86.0	85.0	84.0	83.0	82.0	81.0
79	5	IGY 450A3	F	N	8.0	Y	+20	+20	6125	70	30.05	53	90.0	89.0	88.0	88.0	87.5	87.0	86.0	85.0				
20	29	IJO F18A3	F	N	9.0	Y	+ 8	+ 8	8109	70	30.02	62					86.0	88.0	82.5	86.5	85.5	84.0		
199	7	IJO F18A3	F	N	9.0	Y	+ 8	+ 8	10010	70	30.30	61				85.0	87.0	89.0	90.8	88.0	85.0	88.5	90.5	87.5
21	29	IXR F25A3	F	N	9.0	Y	+ 8	+ 8	8316	70	30.22	60					87.0	88.0	87.5	86.0	84.5			
90	5	JA 318A4	F	N	8.8	Y	+18	+18	11085	74	30.18	68									79.0	80.5	81.5	83.5

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK ADV AS RCD	SPK ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
29	29	JA 318M5	F	N	8.8	N	+22	+22	7840	70	30.03	60	89.0	87.0	85.0	84.0	83.5	83.0						
91	5	JA 318M5	F	N	8.8	Y	+22	+22	6336	73	30.27	56		88.5	87.5	86.0	85.0	84.5	83.5	83.5	83.0	82.5	82.0	81.0
208	7	JA 318M5	F	N	8.8	N	+22	+22	22460	70	30.20	56			76.5	80.2	82.6	83.5	82.6	81.6	80.6	79.5	78.6	77.6
64	5	KEC 222A3	F	N	9.0	Y	+10	+10	10425	73	30.15	60					81.0	81.0	81.5	82.5	83.0	84.5	86.0	84.5
185	7	KEC 222A3	F	N	9.0	Y	+21	+10	8833	71	30.09	58					82.0	84.0	85.9	87.5	87.9	86.6	85.0	83.1
1	29	KED F22A3	F	N	9.0	Y	+ 6	+ 6	13241	75	30.03	64						90.0	90.5	90.5	90.0	88.5	87.0	
2	29	KED F22A3	F	N	9.0	Y	+ 6	+ 6	17046	70	30.25	57					91.0	89.5	88.0	87.0	86.0			
125	62	KED F22A3	F	N	9.0	Y	+ 6	+ 6	8323	68	30.20	48					83.0	88.0	90.0	88.8	87.6	86.5	85.3	84.3
186	7	KED F22A3	F	N	9.0	Y	+ 6	+ 6	6879	70	30.40	56						83.0	86.2	84.8	83.8	84.8	85.2	84.2
211	60	KED F22A3	F	N	9.0	Y	+ 8	+ 6	19794	68	30.10	48					89.8	91.5	91.0	90.3	89.5	88.5	87.5	86.5
253	28	KED F22A3	F	N	9.0	Y	+ 6	+ 6	14859	70	29.39	35					87.0	86.5	86.0	85.5	84.5	83.0	81.0	79.0
322	41	KED F22A3	C	N	9.0	Y	+ 6	+ 6	7631	67	30.10	66							84.0	85.0	86.0	86.0	86.0	85.5
254	28	KEE TF22A3	F	Y	8.1	Y	+12	+12	16097	70	29.34	55				84.7	87.0	88.6	88.0	87.5	83.0			
137	26	KGE TF22A3	F	Y	8.1	Y	+18	+12	10673	70	30.00	80					84.0	87.5	89.5	90.0	90.0	89.5	88.5	87.0
3	29	KKC 222A3	F	N	9.0	Y	+10	+10	18747	70	30.15	58						87.0	87.0	86.0	84.5	83.5		
65	5	KKC 222A3	F	N	9.0	N	+10	+10	6004	70	30.10	52			83.0	84.0	85.0	86.0	87.0	87.0	87.0	83.5	83.5	83.0
324	41	KKC 222A3	F	N	9.0	Y	+10	+10	16380	66	30.30	68					84.0	85.5	86.5	87.0	87.0	87.0	86.0	
187	7	KKG 226A3	F	N	8.7	Y	+ 7	+ 7	6872	68	30.10	56				83.0	85.4	88.0	90.2	88.8	87.5	86.3	85.3	84.4
323	41	KLC 222A3	C	N	9.0	N	+10	+10	13455	72	29.92	76						84.0	88.0	90.0	90.0	88.5	85.0	
139	26	KMP 252A3	F	Y	8.7	Y	+16	+16	10388	83	30.00	13			93.0	92.0	91.0	90.0	88.5	87.5	86.0			
22	29	LAE 230A3	F	N	8.4	Y	+15	+15	19805	70	30.15	57						89.0	88.5	87.0	84.0			
200	7	LAE 230A3	F	N	8.4	Y	+15	+15	7150	65	30.42	60			83.5	87.0	90.0	90.0	88.0	86.2	84.6	83.2	82.5	82.0

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK ASRCD	ADV ASTST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY 1000	R.F. 1250	OCTANE 1500	NUMBER 1750	REQUIREMENTS, 2000	AT 2250	RPM 2500	2750	3000	3250	3500	3750
438	47	LAE 230A3	C	N	8.4	Y	+15	+15	11000	70	30.14	50					82.0	83.5	84.0	84.0	84.0	83.0	82.0	80.0
59	8	LAE 230A3	F	Y	8.4	Y	+15	+15	25323	80	29.86	74						78.0	77.5					
80	5	LAE 230A3	F	Y	8.4	Y	+15	+15	8954	70	30.15	55			84.0	84.5	85.0	86.5	88.0	88.0	84.5	83.5	83.0	
82	5	LAE 230A3	F	Y	8.4	Y	+15	+15	8206	74	30.40	63			81.0	84.0	82.5	82.0	81.5	81.0	80.5	80.0	79.0	78.0
273	28	LAE 230A3	F	Y	8.4	Y	+15	+15	17619	70	29.38	50				83.5	85.0	86.5	87.0	83.7	83.0			
277	28	LAE 230A3	F	Y	8.4	Y	+15	+15	12694	70	29.24	38					81.0	85.0	84.0	83.0	82.0	81.5	81.0	80.0
340	41	LAE 230A3	C	Y	8.4	Y	+15	+15	14262	66	30.04	63					88.0	90.5	91.5	92.0	92.0	91.5	90.5	
159	26	LAR F25A3	F	N	9.0	Y	+ 8	+ 8	21112	89	29.88	127			91.0	91.0	90.5	89.5	88.5	87.5	86.0	84.5	83.0	81.5
342	41	LAR F25A3	C	N	9.0	Y	+ 8	+ 8	17177	68	30.21	66					90.0	90.5	91.0	91.0	91.0	91.0	91.0	90.5
23	29	LBY 450A3	F	N	8.0	Y	+20	+20	16949	70	30.27	58				85.5	86.5	86.0	85.0	84.5	83.0	82.0		
304	46	LBY 450A3	F	N	8.0	Y	+25	+20	6263	73	29.48	80					85.8	85.5						
58	8	LBY 450A4	F	N	8.0	Y	+20	+20	6724	84	29.88	58					84.0	84.5	82.0	80.5	79.0	78.0	77.0	76.0
201	7	LDY 450A4	F	N	8.0	Y	+20	+20	19764	65	30.31	60			85.0	88.5	90.3	89.0	87.5	86.0	85.0	83.8	82.8	
160	26	LEY 450A4	F	N	8.0	Y	+20	+20	8537	78	30.06	121			80.0	87.0	86.5	86.0	84.5	83.0	80.5	77.5		
24	29	LGA 238A3	F	Y	8.0	Y	+15	+15	7865	70	29.97	59			91.0	90.0								
56	8	LG9 TF38A4	F	Y	8.0	Y	+22	+22	8371	90	29.75	125						87.5	92.0					
318	40	LG9 TF38A4	C	Y	8.0	Y			9850	51	30.19	38			90.0	90.2	90.8	91.5	95.0	95.8	96.0	92.6	91.5	90.8
202	7	LJP F20A3	F	N	9.3	Y	+ 6	+ 6	10516	65	30.25	56								89.5	91.4	90.0	88.4	87.0
305	46	LJP F20A3	F	N	9.3	Y	+ 6	+ 6	6115	75	29.50	92							85.5	86.0	86.0			
203	7	LJO F18A3	F	N	9.0	Y	+ 9	+ 8	11859	68	30.12	48							86.0	88.5	91.0	92.0	91.0	89.5
343	41	LJO F18A3	C	N	9.0	Y	+10	+10	6735	75	30.03	81							85.0	87.0	87.5	88.0	87.5	86.5
281	28	LXR F25A3	F	N	9.0	Y	+ 8	+ 8	15343	70	29.24	45					84.0	87.5	90.0	88.5	87.0	84.0	82.0	79.0

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK RCD	ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
40	8	MCR 123A3	F	N	9.0	Y	+ 5	+ 5	26402	80	29.93	37			90.0	92.5	91.0	89.5	88.0	87.0				
174	4	MCR 123A3	F	N	9.0	N	+15	+15	6533	83	29.17	84			76.5	78.0	78.5	78.5	78.0	77.5	76.5	76.0	L	L
294	46	MCR 123M5	F	N	9.0	Y	+15	+15	29277	80	29.60	94			81.0	81.5	82.0	81.8	81.0	80.0				
331	41	ME3 F38A3	C	N	8.7	Y	+10	+10	23253	70	30.26	60				87.0	87.5	88.0	88.5	89.0	89.0	89.0	88.0	87.5
69	5	MFF F50A4	F	N	8.4	Y	+10	+10	11111	70	30.20	52			91.0	91.0	90.5	90.0	90.0	89.5	89.0	89.0	88.5	88.0
41	8	NAR F25A3	F	N	9.0	Y	+ 8	+ 8	8475	75	30.20	49							86.0	87.0	86.0	85.0	84.0	
42	8	NAX 228A3	F	N	8.5	Y	+10	+10	11592	80	29.66	99			88.0	87.0	85.5	84.5						
70	5	NAX 228A3	F	N	8.5	Y	+10	+10	10645	70	30.35	52	94.0	93.0	91.0	90.0	89.0	88.5	88.0	88.0	87.5	87.5	87.0	86.0
192	7	NAX 228A3	F	N	8.5	N	+10	+10	13923	74	30.40	68				77.0	79.4	81.5	84.0	84.0	83.0	81.8	80.6	79.4
251	44	NAX 228A3	F	N	8.5	Y	+11	+11	28059	70	30.13	22					84.0	85.3						
312	40	NAX 228A3	F	N	8.5	Y	+10	+10	17022	56	30.01	50			90.0	90.5	90.4	89.2						
333	41	NAX 228A3	C	N	8.5	Y	+ 9	+10	14779	83	30.09	63		89.0	89.5	90.0	90.0	89.5	89.5	89.0	88.5	88.0	87.5	87.0
432	47	NAX 228A3	C	N	8.5	Y	+ 8	+10	6850	70	29.98	50			86.0	90.0	91.5	89.0	85.0	83.5	83.0	82.0	81.5	80.5
4	29	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	10002	70	30.25	57				90.5	89.5	88.5	86.5	84.5				
43	8	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	14416	80	29.74	78			86.0	88.0	87.0	85.5	84.5					
44	8	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	7117	80	29.90	69					80.0	83.0	84.0	82.5	81.0			
128	62	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	11336	70	30.28	68		82.0	85.0	87.5	88.3	87.8	86.9	85.9	84.8	83.4	82.0	
147	26	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	9389	85	30.08	92	88.0	88.0	88.0	88.0	88.0	88.0	88.0	88.0	88.0			
148	26	NBH 450A4	F	N	8.6	Y	+ 6	+ 6	18342	86	30.08	119	87.0	88.5	89.5	90.0	90.0	89.5	89.5	89.0	88.0	87.5	87.0	86.5
175	4	NBH 450A4	F	N	8.6	Y	+ 8	+ 8	8757	87	29.20	87		94.0	94.0	93.5	93.0	92.5	92.0	91.0	90.0	89.0	87.5	86.0
313	40	NB9 238A3	F	N	8.6	Y	- 2	0	30300	57	29.61	70				92.0	91.5							
5	29	NFH 450A4	F	N	8.6	Y	+ 6	+ 6	9232	70	29.97	61	H	H	100.0	99.0	97.0							

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK ASRCD	ADV ASTST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
45	8	NFH 450A4	F	N	8.6	Y	+ 6	+ 6	14532	80	29.78	84		87.0	88.0	86.5								
149	26	NFH 450A4	F	N	8.6	Y	+ 6	+ 6	22404	90	30.04	120	90.0	90.0	89.5	89.0	88.0	87.5	86.5	86.0	85.0	84.5	83.5	83.0
6	29	NF1 228A4	F	N	8.5	Y	+10	+10	11523	70	29.93	82		91.5	90.0	88.0	86.5							
71	5	NF1 228A4	F	N	8.5	Y	+10	+10	7887	70	30.27	52		93.0	92.0	88.5	83.5	82.5	82.0	81.5	81.0	81.0	80.5	80.0
334	41	NF1 228A4	C	N	8.5	Y	+10	+10	22320	67	30.10	66		92.0	92.0	91.5	91.0	90.5	90.0	89.0	88.0	87.5	86.5	85.5
335	41	NF1 228A4	C	N	8.5	Y	+10	+10	23241	72	30.10	63	91.0	92.0	92.0	92.0	92.0	91.5	91.0	90.0	89.5	89.0	88.0	87.0
193	7	NGH 450A3	F	N	8.6	Y	+ 6	+ 6	6843	69	29.94	54			85.0	87.0	88.0	88.5	88.6	86.6	84.8	82.8	81.0	
194	7	NG9 238A3	F	N	8.6	Y	- 2	0	9544	70	30.12	61			86.0	88.5	91.0	90.5	88.8	87.0	85.2	84.0		
7	29	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	19744	70	30.03	70					89.0	89.5	90.5	93.0	91.0	89.5	89.0	
8	29	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	19345	70	30.15	57							89.0	88.5	87.5	85.5		
46	8	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	11560	75	29.70	45							84.0	85.0	87.0	86.5	85.5	84.5
72	5	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	6624	70	29.80	54		98.0	96.5	94.0	93.0	92.5	92.5	92.0	92.0	92.0	92.0	92.0
129	62	NJP F20A3	F	N	9.3	N	+ 4	+ 8	7210	70	30.50	56							89.0	92.5	94.6	93.4	91.4	89.5
176	4	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	7616	82	29.18	51							85.0	87.0	87.0	86.5	85.5	85.0
263	28	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	15089	70	29.30	55				83.5	87.3	88.0	88.0	85.3	84.0			
264	28	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	8367	70	29.27	50						85.0	89.0	90.0	88.0	86.5	85.0	83.0
295	46	NJP F20A3	F	N	9.3	Y	+ 4	+ 6	10800	76	29.50	100							82.0	82.0	81.6			
48	8	NTC 218A3	F	N	9.0	Y	+ 8	+ 8	14998	80	29.78	100							86.0	85.5	84.5	84.0	83.0	82.0
130	62	NTC 216A3	F	N	9.0	Y	+ 8	+ 8	7099	71	30.13	60					82.0	83.2	84.2	85.2	86.0	86.1	85.7	85.0
296	46	NTC 216A3	F	N	9.0	Y	+ 8	+ 8	10967	80	28.92	94					87.0	88.0	88.0					
73	5	NTC 216M4	F	N	9.0	N	+ 8	+ 8	15780	70	30.15	74			89.5	89.5	89.0	88.5	88.0	87.0	86.5	85.5	84.5	83.5
9	29	NXR F25A3	F	N	9.0	Y	+ 8	+ 8	6549	70	30.27	60						85.0	86.5	85.5	84.5	83.0	82.0	

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK ADV AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
314	40	NXR F25A3	F	N	9.0	Y	+10	+8	11114	58	30.15	39							88.0	88.5				
214	60	NXX 228A3	F	N	8.5	Y	+ 8	+10	8040	70	30.30	66		90.0	93.2	92.0	90.8	89.4	87.8	86.3	85.0	83.9		
433	47	NY8 F57M4	F	N	9.0	Y	+ 4	+ 6	28500	70	30.17	46	84.0	87.5	91.0	91.0	91.0	87.0	86.0	85.0	84.5	84.0		
327	41	OA4 216A3	C	N	9.0	N	+14	+14	7697	69	30.18	81	89.0	90.0	90.5	91.0	91.0	91.0	90.5	90.5	90.0	89.5	89.0	88.5
292	46	OA4 216M5	F	N	9.0	Y	+12	+12	17571	76	29.55	96					92.0	91.8	90.6					
427	47	OA4 216M5	C	N	9.0	Y	+14	+12	15000	70	30.12	50					90.0	90.0	89.5	89.0	88.0	87.0	86.0	84.0
428	47	OA5 F16A3	C	N	9.0	Y	+10	+10	6200	70	30.10	50	85.0	87.0	88.0	88.0	88.0	87.5	87.0	87.0	86.5	86.0	85.5	85.0
258	28	OBW TF23M5	F	Y	8.0	Y	+10	+10	15826	70	29.38	50				81.3	83.0	84.7	85.0	82.8	82.0			
141	26	OB3 F38A3	F	Y	8.7	Y	+10	+10	7482	76	30.08	106			89.5	90.0	89.5	87.5	83.0					
38	8	OCR 123A3	F	N	9.0	Y	+10	+10	11331	80	30.18	84			86.0	86.5	85.5	84.0	83.0	82.0				
67	5	OCR 123A3	F	N	9.0	Y	+15	+15	13683	70	30.40	55		89.0	91.0	89.0	88.5	88.5	88.5	88.5	88.5	88.0	88.0	87.0
68	5	OCR 123A3	F	N	9.0	Y	+10	+10	10516	72	30.37	45			86.0	88.0	88.0	88.0	87.0	85.5	85.0	84.0	83.5	83.0
143	26	OCR 123A3	F	N	9.0	Y	+15	+15	21240	77	29.94	116		86.5	89.0	90.0	90.0	90.0	89.5	89.0	88.5	87.5	87.0	86.0
189	7	OCR 123A3	F	N	9.0	Y	+15	+15	17103	70	30.50	82				86.5	89.8	91.6	90.7	89.8	88.8	87.8	87.0	86.0
190	7	OCR 123A3	F	N	9.0	Y	+15	+15	12025	70	30.04	61			78.0	80.5	82.8	84.0	84.4	83.8	82.8	81.6	80.5	79.3
212	60	OCR 123A3	F	N	9.0	Y	+25	+15	6590	70	30.10	66				80.0	87.0	86.5	85.0	83.5	82.0	80.6	79.6	79.0
248	44	OCR 123A3	F	N	9.0	Y	+12	+12	17631	74	29.81	55					88.0	89.4	89.4	88.2				
260	28	OCR 123A3	F	N	9.0	Y	+10	+10	7083	70	29.90	50	85.0	87.0	86.5	83.8	82.0							
261	28	OCR 123A3	F	N	9.0	Y	+15	+15	14620	70	29.18	55		84.0	87.0	85.0	83.0	81.0	79.5	78.0	77.5	77.0	76.0	76.0
328	41	OCR 123A3	C	N	9.0	N	+15	+15	12033	71	30.06	70			89.0	90.0	90.0	89.0	88.0					
329	41	OCR 123A3	C	N	9.0	N	+15	+15	14824	74	30.12	73		88.0	90.0	91.0	91.0	90.0	89.0	87.0				
429	47	OCR 123A3	C	N	9.0	Y	+15	+15	27550	70	30.17	50		85.0	88.0	90.0	91.0	91.0	90.5	88.5	87.5	86.5	85.5	85.0

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK ADV AS RCD	SPK ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
430	47	OCR 123A3	F	N	9.0	Y	+15	+15	32300	70	29.99	50		86.5	88.0	89.5	90.0	90.5	90.0	89.5	88.0	87.0	85.5	85.0
311	40	OCR 123M4	F	N	9.0	N	+15	+15	22752	44	29.97	18			88.0	88.3	87.0	85.0						
126	62	OCR 123M5	F	N	9.0	Y	+ 6	+10	6447	72	30.10	67			81.2	84.0	86.8	88.8	87.6	86.0	85.0	83.8	82.9	82.0
144	26	ODW TF23A3	F	Y	8.0	Y	+10	+10	6986	75	29.96	92						86.0	90.0	92.5	93.0	93.0	92.5	91.5
39	8	OD3 F38A3	F	N	8.7	Y	+10	+10	12235	80	29.82						88.5	89.0	88.0	87.0	86.5			
127	62	OD3 F38A3	F	N	8.7	Y	+ 6	+10	13355	72	30.26	58			87.0	91.2	93.4	93.0	92.0	90.8	89.5	87.8	86.0	
191	7	OD3 F38A3	F	N	8.7	Y	+ 6	+10	13821	76	30.22	54			85.0	89.6	89.0	87.5	86.4	85.2	84.0	83.0	82.0	
146	26	OEF F50A4	F	N	8.4	Y	+10	+10	18688	84	30.06	77	83.5	86.5	88.0	88.0	88.0	87.5	86.5	84.5	81.0			
330	41	OE3 F38A3	C	N	8.7	Y	+10	+10	19741	65	30.20	60			89.5	90.0	90.0	90.5	91.0	91.0	91.0	91.0	90.5	90.0
262	28	OE3 F38A4	F	N	8.7	Y	+10	+10	16067	70	29.37	50		87.0	91.0	89.0	88.0	87.5	87.0	85.5	85.0	84.0	83.5	82.0
213	60	OFF F50A3	F	N	8.4	Y	+10	+10	9034	70	30.24	54		84.5	88.0	90.3	90.5	89.3	87.0	85.3	84.0	83.0	82.3	82.0
293	46	OFF F50A4	F	N	8.4	Y	+ 7	+10	19474	77	29.42	78		93.5	94.0	94.0	92.0	90.5						
34	8	PKC 222A3	F	N	9.0	Y	+10	+10	6598	80	30.21	45						84.5	88.0	88.5				
136	26	PKC 222A3	F	N	9.0	Y	+10	+10	14478	80	30.10	82			85.0	86.0	87.0	87.5	88.0	88.0	88.0	87.5	87.0	86.5
172	4	PKC 222A3	A	N	9.0	Y	+10	+10	6435	82	29.18	75							80.0	82.0	81.5	81.0	80.0	79.0
290	46	PKC 222A3	F	N	9.0	Y	+10	+10	7427	78	29.42	98							82.0					
321	41	PKC 222A3	C	N	9.0	N	+10	+10	15575	78	29.97	53						82.5	85.0	86.5	87.0	86.0	84.0	81.0
425	47	PLC 222A3	C	N	9.0	Y	+14	+10	20892	70	30.03	40					84.0	91.0	92.0	90.0	89.5	88.5	86.0	84.5
35	8	PLC 222A3	F	N	9.0	Y	+10	+10	15023	75	29.95	53						78.5	81.0	82.0	81.0	80.0	78.5	78.0
63	5	PLC 222A3	F	N	9.0	N	+10	+10	6077	72	29.90	71		83.0	83.5	84.0	84.5	85.5	86.0	86.0	84.0	83.0	82.5	82.0
184	7	PLC 222A3	F	N	9.0	Y	+ 8	+10	7008	70	30.12	68						81.0	84.4	84.3	83.6	82.6	81.8	80.8
426	47	PLC 222A3	C	N	9.0	Y	+10	+10	21400	70	29.98	50						82.5	83.0	82.8	82.5	82.5	81.3	80.7

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK ADV AS RCD	SPK ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
33	8	RA6 F14A3	F	N	9.0	Y			22123	77	29.53	42								83.5	86.0	85.0	83.5	82.5
252	28	RA6 F14A3	F	N	9.0	Y	0	0	14780	70	29.38	50					83.0	86.3	87.0	84.8	83.7			
320	41	RA6 F14A3	C	N	9.0	Y			19292	64	30.04	54			.				89.5	90.0	91.0	91.0	91.0	90.5
249	44	SGF F50A4	F	N	8.4	Y	+ 8	+10	19074	73	29.95	45			88.0	89.3								
332	41	SGF F50A4	C	N	8.4	Y	+10	+10	18295	62	29.98	70			89.0	90.0	90.0	89.5	89.0	89.0	88.5	88.0	87.5	
250	44	SHF F50A4	F	N	8.4	Y	+ 5	+10	23366	78	29.70	51			92.0	93.2	91.4							
85	5	KTSC 222M4	F	N	9.0	N	+10	+10	6946	70	29.80	50		92.0	92.0	92.0	92.0	91.5	91.0	90.5	90.5	90.0	90.0	90.0
442	47	KVMT 252A3	C	N	8.2		+16	+16	11050	70	29.94	50				87.5	90.0	97.0	99.0	97.0	90.0	86.5		
284	28	KVSC 222A3	F	N	9.0	Y	+10	+10	10524	70	29.24	55					78.0	79.8	80.0	81.8	79.0			
182	26	NTLH 450A3	F	Y	9.2	Y	+ 4	+ 4	9727	77	30.10	86	L	L	L	L	L	L	L	L	L	L		
344	41	NTLL 457A4	C	N	8.2	Y	+ 6	+ 6	15968	71	30.00	64	83.0	84.5	85.0	85.0	84.5	84.0	84.0	84.0	83.5	83.0	83.0	
164	26	NTSB 228A4	F	N	8.5	Y	+12	+12	19694	75	30.23	34			94.0	93.5	93.0	92.0	91.5	91.0	90.0	89.5	89.0	88.0
183	5	NTSB 228A4	F	N	8.5	N	+10	+12	7307	70	30.30	52		85.0	91.0	87.5	85.0	83.5	82.0	81.0	80.5	80.0		
165	26	NTSB 228M5	F	N	8.5	Y	+ 8	+ 8	15249	84	29.88	135			83.0	85.0	86.0	86.0	86.0	85.5	85.0	84.5	84.0	83.5
26	29	NVLF 450M4	F	N	8.6	Y	+ 6	+ 6	10133	70	30.10	60			88.0	87.5	86.5	85.5	84.0					
179	4	NVLH 450A3	F	Y	9.2	N	+ 5	+ 5	6636	90	29.10	88					90.0	87.0	82.0	79.0	77.5	76.5	76.0	L
286	28	NVMH 450A3	F	Y	9.2	Y	+ 4	+ 4	16833	70	29.32	50				84.5	87.0	85.7	83.0	82.2	81.0			
206	7	NVML 457A4	F	N	8.2	Y	+10	+ 8	10589	70	30.21	61	89.0	91.0	87.5	85.8	88.0	86.9	85.5	84.4	83.4	82.6	82.0	
178	4	OTLA 123M4	F	N	9.0	N	+ 7	+ 7	9045	83	29.18	68			95.0	95.0	94.5	94.0	93.5	92.5	91.5	91.0	89.5	88.5
87	5	OTMY 149M3	F	N	8.4	N	+10	+10	6486	72	30.41	53	89.0	90.0	90.5	91.5	88.5	87.5	86.5	85.5	83.5	81.5		
86	5	OTSS 228M4	F	N	8.7	Y	+10	+10	23597	70	30.10	53			90.0	90.0	89.0	87.5	87.0	86.0	85.5	85.0	85.0	84.0
205	7	OTSY 149M4	F	N	8.4	N	+10	+10	6469	70	30.42	60	90.0	89.8	88.5	87.0	85.6	84.2						

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK ADV AS RCD	SPK ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
204	7	PVSC 222A3	F	N	9.0	Y	+10	+10	14954	70	29.92	66						80.0	83.0	84.5	84.0	83.0	82.0	80.8
441	47	PVSG 226A3	C	N	8.7	Y	+ 7	+ 7	14700	70	30.08	50						80.5	83.0	81.0	81.0	80.0	78.0	76.5
282	28	RVS2 225A3	F	Y	9.2	Y	+12	+12	16421	70	29.28	50			80.0	81.7	84.0	82.5	81.0	80.5	80.0			
27	29	A F20M5	F	N	9.25	Y	+16	+16	8141	70	30.12	57				95.0	95.5	94.0	93.5	91.5				
28	29	A TF20A3	F	N	8.5	Y	+20	+20	6925	70	31.25	62						97.0	98.0	98.0	96.0			
345	41	C 216A3	C	N	8.5	N	+ 2	+ 5	7566	68	30.04	60					80.0	82.0	83.5	84.0	84.0	83.5	82.5	81.0
88	5	E 216A3	F	N	9.4	Y	+ 8	+ 8	7110	70	30.10	50			84.0	85.5	86.5	87.0	87.0	86.5	86.0	85.0	84.5	84.0
134	62	E 216A3	F	N	9.4	N	+ 5	+ 8	13593	70	30.20	50					82.2	89.0	88.8	87.2	85.8	84.2	83.0	81.8
133	62	E 216M5	F	N	9.4	Y	+15	+15	10393	67	30.22	50					78.8	83.6	82.8	81.8	80.6	79.5	78.5	77.5
207	7	E 216M5	F	N	9.4	N	+15	+15	11303	70	30.00	66				89.0	93.0	92.8	91.5	90.4	89.3	88.2	87.2	86.5
288	28	E F20A3	F	N	8.5	Y	0	0	15971	70	29.42	55					83.0	82.8	81.0	80.5	80.0			
89	5	E F30M5	F	N	9.0	Y	+20	+20	12776	75	30.27	78	88.0	87.5	86.0	84.5	83.5	82.5	82.0	81.0	80.0	79.5	79.0	78.5
166	26	E F30M5	F	N	9.0	Y	+30	+20	16882	73	30.18	80				84.0	84.0	84.0	84.0	83.5	83.0	82.0	81.0	79.5
318	40	E TF30A4	F	Y	7.8	Y	+20	+20	6000	40	29.90	26									85.0	85.1	85.5	86.3
181	4	J 318A4	A	N	8.8	N	+18	+18	9920	80	29.03	63							77.5	79.5	80.0	79.5	78.0	76.5
346	41	J 318A4	C	N	8.8	Y	+18	+18	6893	74	30.03	64								82.5	84.5	85.0	83.5	80.0
445	47	J 318M5	C	N	8.8	Y	+24	+20	6600	70	29.94	50	82.0	84.5	87.0	88.5	88.5	88.0	87.0	85.5	84.0	83.0	82.0	81.0
446	47	J 318M5	C	N	8.8	Y	+18	+18	15002	70	29.96	50					88.5	89.0	89.0	89.0	89.0	89.0	88.0	87.0
447	47	J 318M5	C	N	8.8	Y	+18	+18	25800	70	29.94	48	80.0	83.0	84.0	84.8	86.0	86.0	86.0	84.4	83.0	81.6	80.0	
448	47	Q 218M4	F	N	8.7	Y	+10	+ 8	9700	70	30.10	50	87.0	88.5	89.0	88.5	87.0	87.0	86.5	86.0	85.5	85.5	85.0	84.5
167	26	Q 218M5	F	N	8.7	Y	+ 8	+ 8	13864	81	30.05	116			94.0	93.5	92.5	91.5	90.0	89.0	87.5	86.0	84.5	
182	4	T 215A3	F	N	9.0	N	+ 7	+ 7	10974	72	29.44	21						87.5	89.0	88.5	88.0	86.5	85.5	84.5

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMC T	KSE N	C.R.	AIR	SPK ADV AS RCD	SPK ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
31	29 T	215M4	F	N	9.0	N	+ 5	+ 5	9387	70	30.25	57			94.5	93.5	92.0	90.5	89.0	88.0				
30	29 T	216A3	F	N	9.0	Y	+ 5	+ 5	7037	70	29.97	59							92.0	94.5	93.0	91.5	90.0	
62	8 T	216A3	C	N	9.0	Y	+ 5	+ 5	24641	75	29.59	58								86.0	87.0	86.0	84.5	84.0
168	26 T	216A3	F	N	9.0	Y	+ 8	+ 5	16918	80	30.13	74				86.0	86.0	85.5	85.0	84.0	83.0			
216	60 T	216A3	F	N	9.0	Y	+ 5	+ 5	8691	71	29.96	68				88.0	90.7	90.0	88.5	89.0	91.0	91.0	90.2	89.0
169	26 T	F20A4	F	N	8.7	Y	+ 5	+ 5	14129	70	30.25	22				95.0	95.0	95.0	95.0	94.5	93.5	93.0	96.0	95.5
449	47 T	F20A4	C	N	8.7		+ 3	+ 5	7350	70	30.15	50					88.0	88.5	88.0	87.0	86.0	85.0	85.0	84.0
450	47 T	F20A4	C	N	8.7	Y	+ 3	+ 5	9800	70	30.02	50				86.5	89.0	89.5	89.0	88.5	88.0	87.5	87.0	86.5
451	47 T	F20A4	C	N	8.7	Y	+ 5	+ 5	8800	70	30.02	46				86.5	89.0	89.0	87.0	86.0	85.5	85.0	84.5	84.0
170	26 T	F24A4	F	N	9.0	Y	+ 5	+ 5	14958	91	29.96	118		86.0	87.5	88.0	88.0	88.0	87.5	86.5	85.5	84.0	82.0	80.5
217	60 T	F24M5	F	N	9.0	Y	+ 4	+ 5	7707	70	30.20	60		83.5	87.6	90.2	90.2	89.8	88.8	87.0	85.0	83.8	82.8	82.2
218	60 T	F28M5	F	N	8.8	Y	+10	+10	9252	70	29.96	61			86.0	91.0	92.5	92.0	91.6	90.8	90.0	89.2	88.4	87.5
209	7 Y	TF16M5	F	N	8.0	Y			6018	70	30.21	56						87.0	91.0	92.2	91.0	89.9	88.7	87.5
452	47 Z	215M4	C	N	9.0	Y	+ 8	+ 6	23000	70	30.19	50		88.5	93.5	93.5	93.0	92.5	91.5	90.5	89.5	89.0	89.0	88.5
289	28 Z	220M5	F	N	8.6	Y	+ 6	+ 6	14781	70	29.41	55			79.0	84.0	83.0	81.7	81.0	80.3	77.0			
347	41 Z	220M5	C	N	8.6	Y	+ 8	+ 8	14385	74	30.08	73		88.5	89.5	90.5	91.0	91.0	90.0	88.0				
453	47 Z	220M5	C	N	8.6	Y	+10	+ 6	22000	70	29.97	50		78.5	82.5	83.0	83.0	83.0	83.0	83.0	83.0	80.0	79.0	78.5
348	41 ZR	F13M5	C	N	9.4	Y	- 5	- 5	9229	70	30.02						81.0	81.5	82.0	82.0	82.0	82.0	81.5	81.0
92	5 ET	224M5	F	N	8.3	Y	+ 5	+ 5	6008	70	30.10	52			87.0	89.0	89.0	89.0	88.5	88.0	87.0	86.5	86.0	86.0
454	47 ET	224M5	C	N	8.3	Y	0	+ 3	18600	70	29.96	50	86.0	87.0	88.0	89.0	89.5	90.0	90.0	88.0	86.0	86.5	85.0	84.5
455	47 TT	F24M5	C	N	9.0	N	+ 2	+ 5	9000	70	30.20	44	86.0	88.0	88.5	88.5	88.5	87.5	86.0	85.5	85.0	85.0	84.5	84.0
171	28 TT	224M5	F	N	9.0	Y	+12	+12	19021	84	30.02	94			86.0	89.0	87.0	84.5	82.0	79.0				

TABLE I-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	KSEN	C.R.	AIR	SPK ADV AS RCD	SPK ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
210	7	TT 224M5	F	N	9.0	N	+ 5	+ 5	7318	70	30.00	61				84.0	86.0	87.5	88.5	88.4	87.7	86.5	85.3	84.0
501	4	DKG 226A3	F	N	8.7	Y	+ 8	+ 8	5777	75	29.11	53							80.0	84.0	83.5	82.0	80.0	78.5
502	4	MA4 216A3	F	N	9.0	N	+14	+14	5318	91	29.21	75	80.0	82.5	85.0	89.5	89.5	88.0	86.5	85.0	83.5	82.0	80.5	79.0
503	4	IGA 238A3	F	Y	8.0	Y	+15	+15	5330	78	29.04	76				83.5	84.0	83.5	83.0	82.0	81.0	79.5	78.5	
505	4	GD8 F41A4	F	N	8.5	Y	+11	+11	5337	82	29.15	90				90.0	89.0	87.5	86.0	85.0	83.0	82.0		
506	4	PVSC 222A3	A	N	9.0	Y	+ 8	+ 8	5687	81	29.28	71						84.0	84.0	83.0	82.5	81.5	80.5	79.0
507	7	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	5927	69	30.20	62							85.0	88.0	90.3	89.8	88.6	87.0
508	7	NJP F20M5	F	N	9.3	N	+ 5	+ 6	5686	70	30.20	64				83.0	84.0	87.0	89.7	88.6	88.0	89.0	89.0	87.2
509	7	IAR F25A3	F	N	9.0	Y	+12	+ 8	5912	67	30.52	48			87.0	89.2	87.0	85.3	86.8	87.8	88.5	87.8	86.0	83.5
510	7	NTSB 228M5	F	N	8.5	Y	+ 6	+ 8	4845	74	30.10	64			88.0	91.5	90.0	88.5	87.2	86.0	85.0	83.9	83.0	82.3
511	60	NJP F20A3	F	N	9.3	Y	+ 6	+ 6	5923	70	30.42	64				85.0	90.0	93.4	92.0	90.5	91.5	90.0	88.8	87.0
512	60	T 215A3	F	N	9.0	Y	+ 5	+ 5	5844	71	30.44	58					84.0	84.0	84.4	85.2	86.5	88.4	90.5	87.5
514	44	KED F22A3	F	N	9.0	Y	+ 6	+ 6	3594	73	29.79	48						85.3	86.4					
515	46	NVMW 474A3	F	N	8.0	Y	+ 4	+ 4	5360	74	29.70	64					87.3	88.0	87.0					
516	40	OA8 TF16M5	F	N	8.0	N	+10	+10	5380		30.07										90.3	91.1	93.8	91.3
517	40	X F18M5	F	N	9.3	Y	+15	+15	1620	52	30.00								85.0	85.7	85.0			

TABLE I-II

PRF SPEED RANGE CALCULATED DATA - 1984 SELECT MODELS

Model Code		Engine rpm 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
KED F22A3/DED F22A3	Mean	-	-	94.0	89.5	88.2	88.4	88.4	88.0	87.4	86.9	86.0	85.0
	SD	-	-	-	5.7	3.2	2.6	2.4	2.3	2.3	2.1	2.3	2.8
	N	-	-	1	2	7	10	11	10	10	9	9	8
PKC 222A3/KKC 222A3/ DKC 222A3	Mean	-	-	84.0	85.0	85.3	85.5	85.4	86.4	85.8	84.8	84.1	82.4
	SD	-	-	1.4	1.4	1.5	1.8	1.0	2.1	2.4	2.5	2.7	3.2
	N	-	-	2	2	3	6	8	7	6	6	5	4
OCR 123A3/MCR 123A3	Mean	85.0	86.6	86.5	86.7	87.3	87.4	86.7	85.6	84.5	83.6	83.6	82.9
	SD	-	1.7	4.4	4.4	3.8	3.9	3.9	4.1	4.6	4.6	4.1	3.9
	N	1	7	13	15	16	15	15	14	10	10	9	9
IAE 230A3/LAE 230A3	Mean	-	-	82.1	84.4	84.6	85.1	83.9	83.8	83.4	82.8	82.1	79.2
	SD	-	-	1.9	1.7	3.2	3.8	4.2	4.3	3.5	4.5	4.4	2.3
	N	-	-	4	7	12	14	15	12	10	7	7	5
NAR F25A3/IAR F25A3/ HAR F25A3/LAR F25A3	Mean	-	93.0	92.3	89.7	88.2	87.4	87.7	87.7	86.9	85.6	84.3	84.7
	SD	-	-	3.0	3.9	4.0	3.2	2.5	2.2	2.5	3.2	3.9	4.6
	N	-	1	4	5	7	7	8	8	8	8	8	5
NAX 228A3/HAX 228A3	Mean	94.0	88.3	88.4	86.9	86.7	86.3	86.2	86.2	85.4	84.5	83.8	83.0
	SD	-	5.0	2.1	4.6	3.9	2.1	2.4	2.2	2.3	2.7	3.2	3.5
	N	1	3	6	8	9	10	7	6	6	6	5	5
HBH 450A4/NBH 450A4	Mean	87.5	88.1	88.5	89.6	88.0	87.8	87.3	86.8	86.4	86.6	85.5	86.3
	SD	.7	4.9	3.5	2.3	4.0	3.0	2.8	3.1	3.5	2.9	3.0	.4
	N	2	4	5	6	7	7	7	6	5	3	3	2
NJP F20A3/LJP F20A3/ IJP F20A3	Mean	-	98.0	96.5	88.8	89.8	88.8	87.5	88.3	88.2	88.7	88.1	86.8
	SD	-	-	-	7.4	2.9	3.1	3.2	3.5	3.8	2.9	2.9	3.4
	N	-	1	1	2	3	4	10	11	11	8	7	6

SD = Standard Deviation; N = Number of Observations

FIGURE I-1

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1984 SELECT MODEL: KED F22A3/DED F22A3

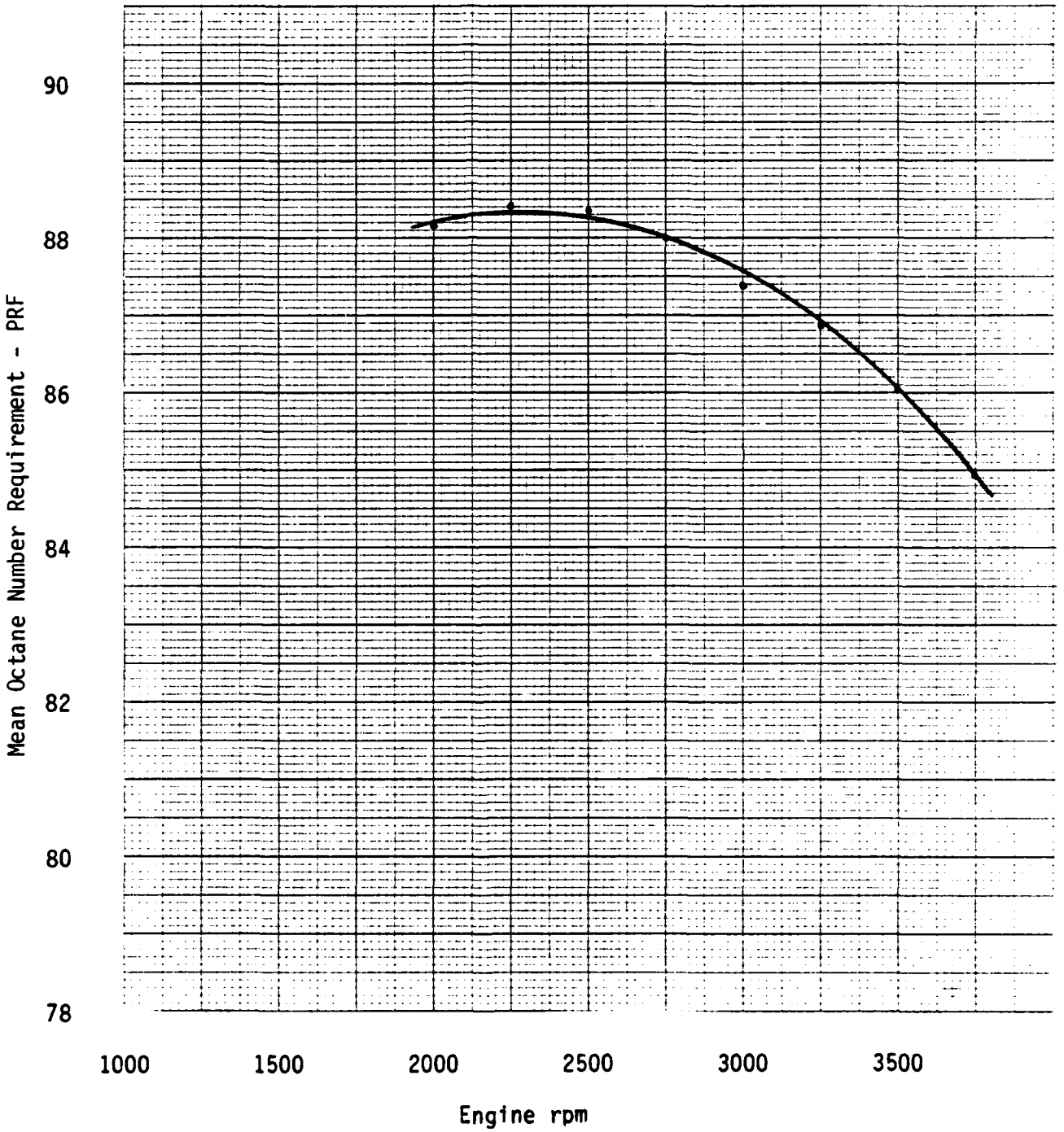


FIGURE I-2

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1984 SELECT MODEL: PKC 222A3/KKC 222A3/DKC 222A3

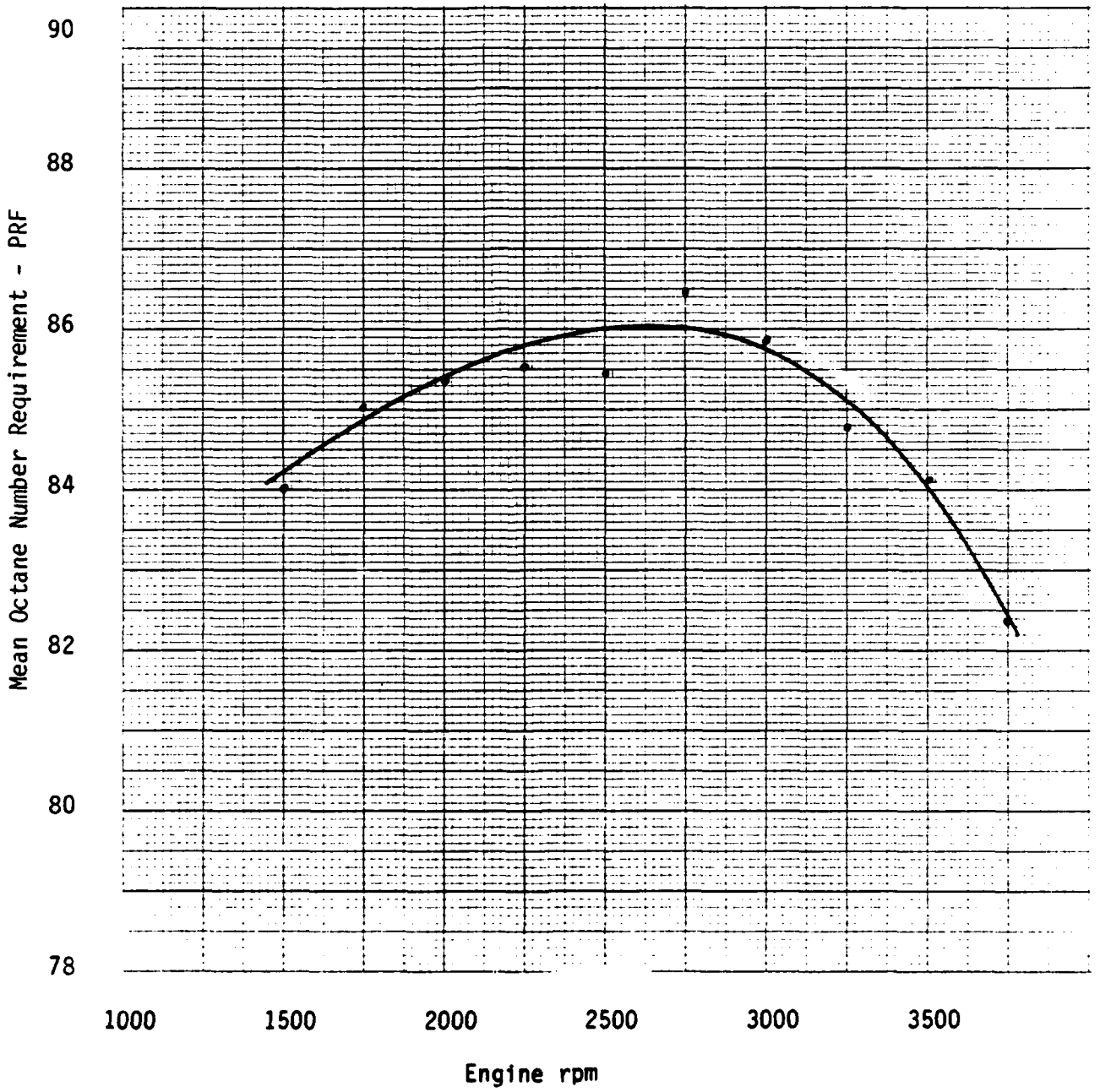


FIGURE I-3

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1984 SELECT MODEL: OCR 123A3/MCR 123A3

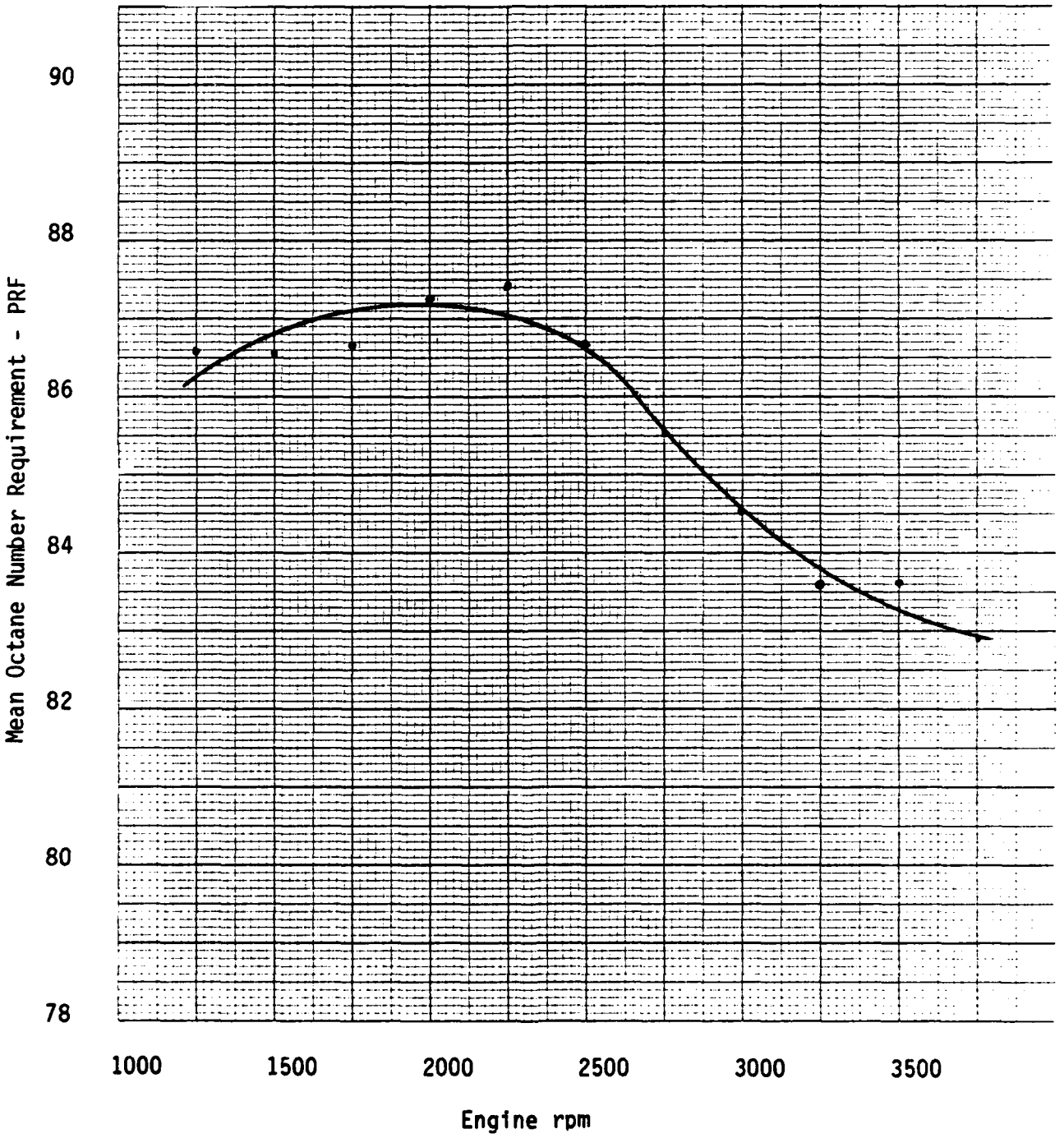


FIGURE I-4

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1984 SELECT MODEL: IAE 230A3/LAE 230A3

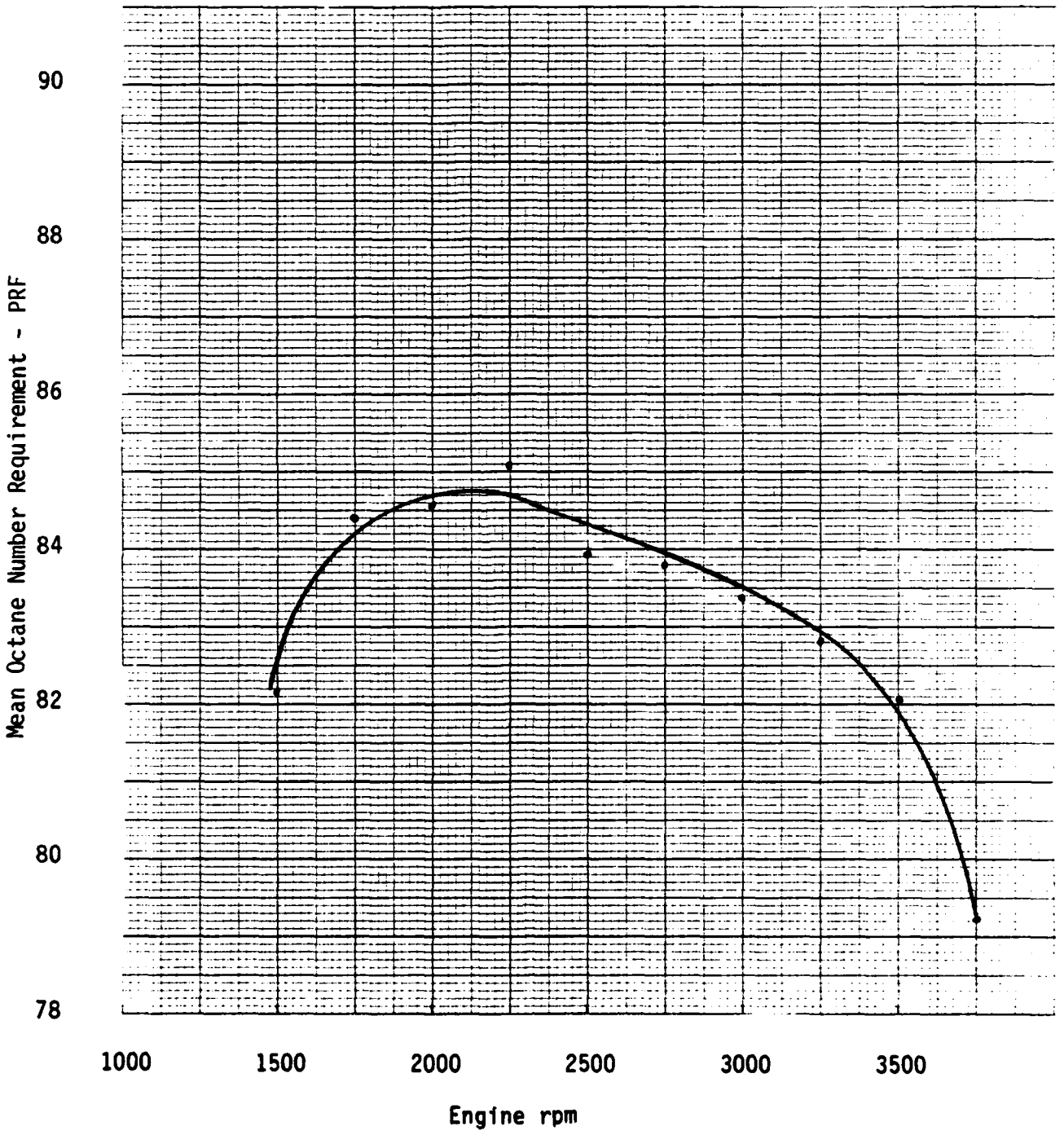


FIGURE I-5

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1984 SELECT MODEL: NAR F25A3/LAR F25A3
HAR F25A3/LAR F25A3

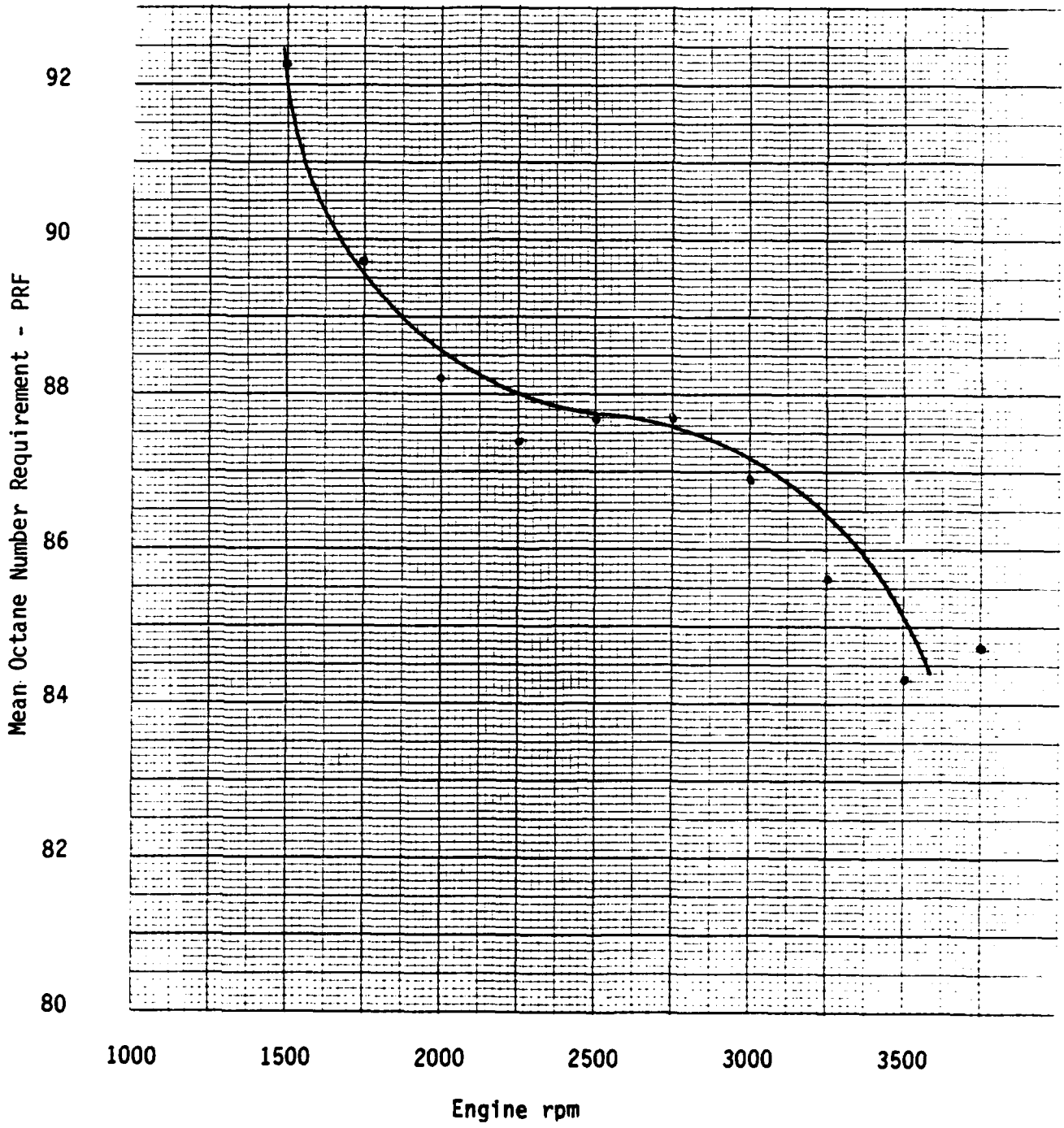


FIGURE I-6

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1984 SELECT MODEL: NAX 228A3/HAX 228A3

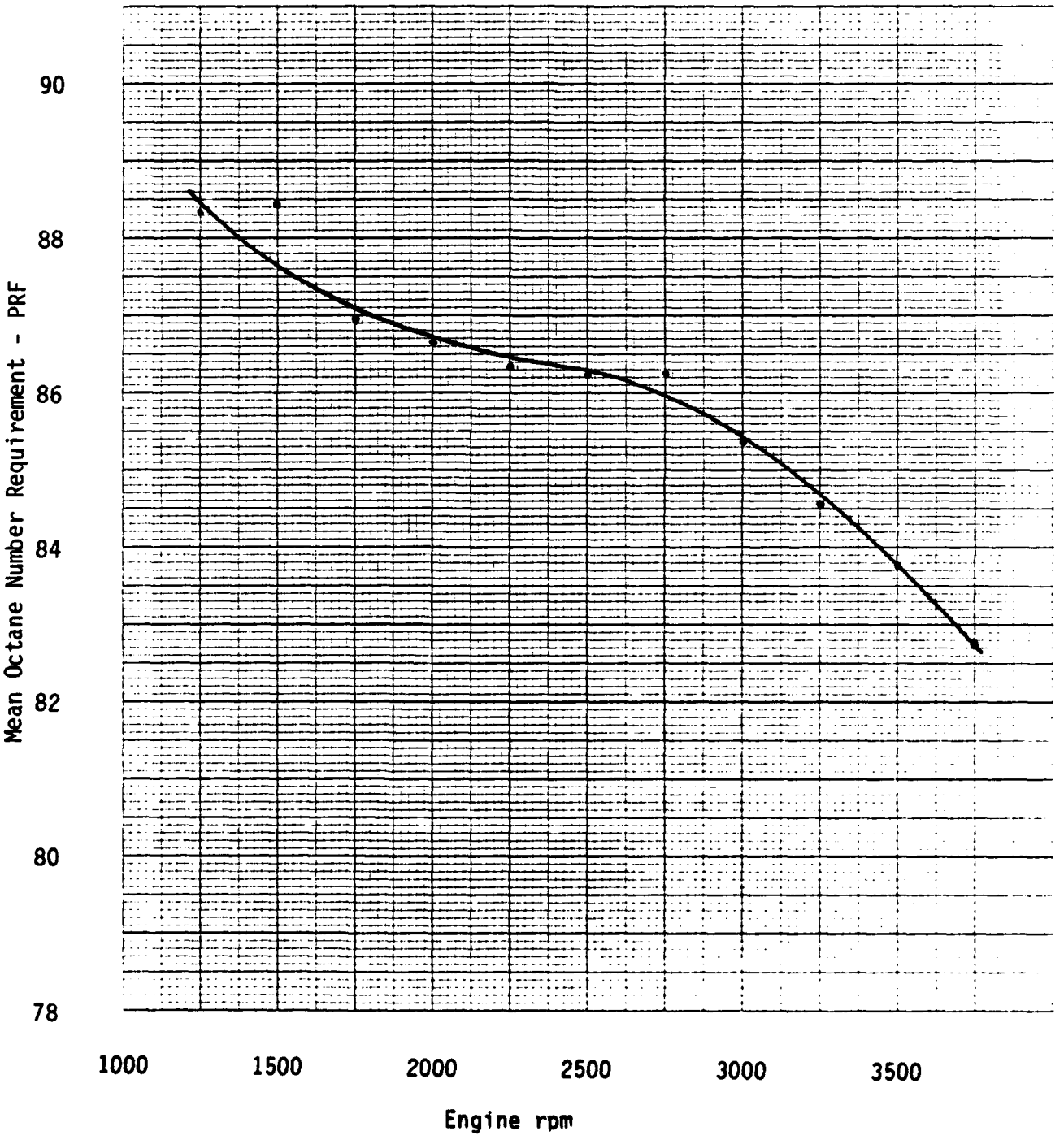


FIGURE I-7

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1984 SELECT MODEL: HBH 450A4/NBH 450A4

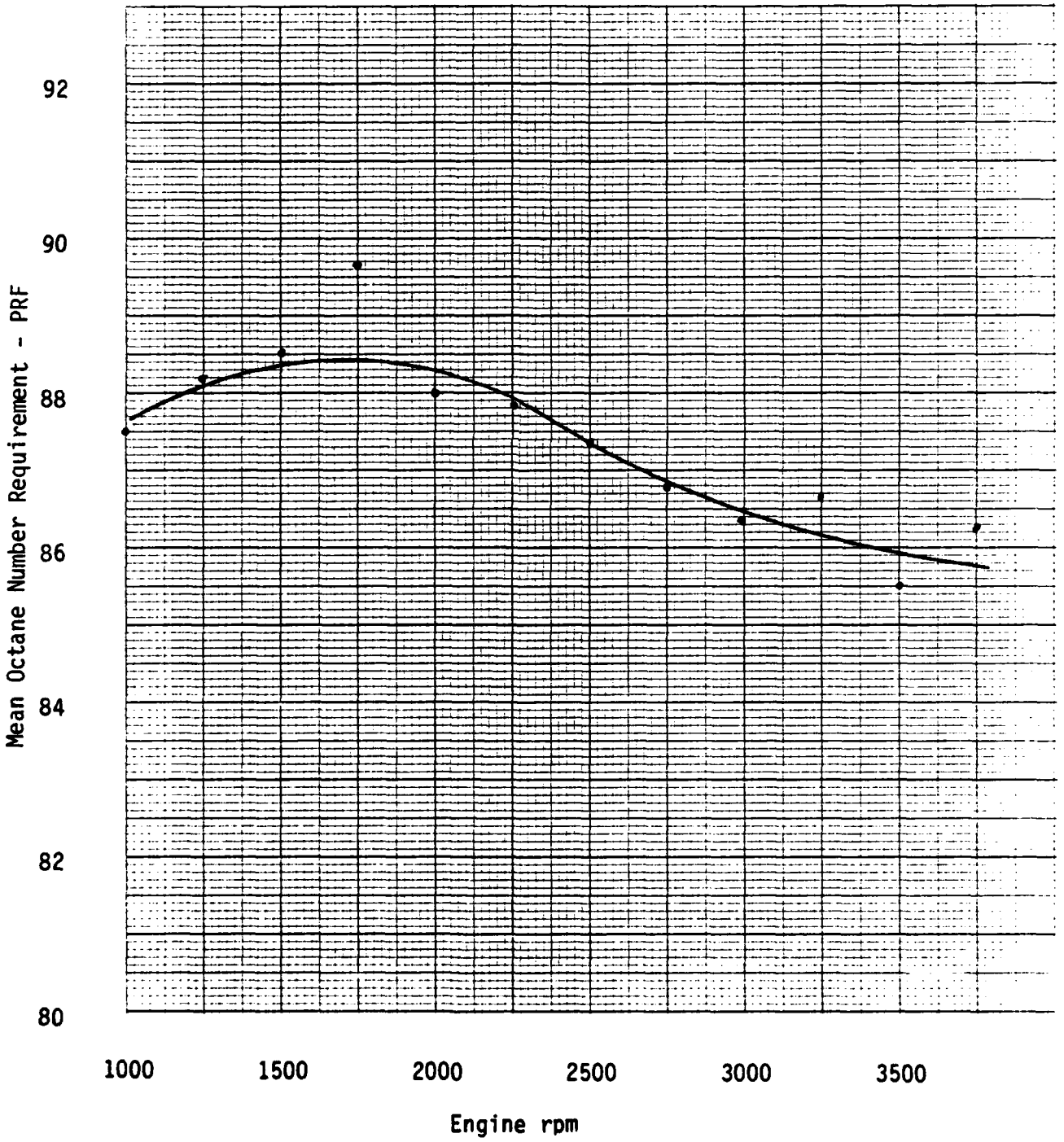
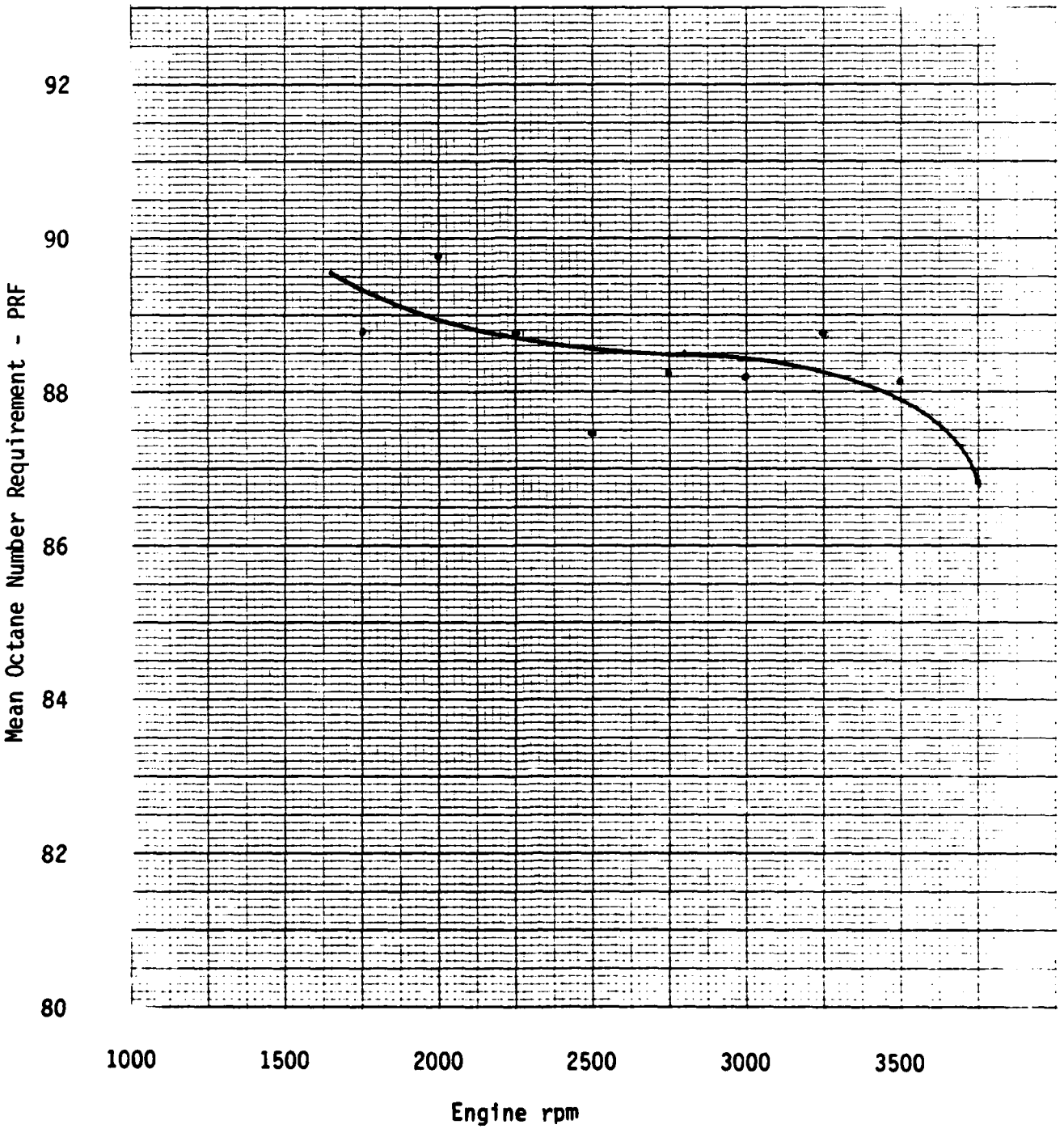


FIGURE I-8

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1984 SELECT MODEL: NJP F20A3/LJP F20A3
IJP F20A3



APPENDIX J

GEAR POSITION FOR
MAXIMUM OCTANE NUMBER REQUIREMENTS

TABLE J-I

THROTTLE/GEAR POSITION FOR 1984 MAXIMUM FBRU OCTANE NUMBER REQUIREMENTS

Throttle Position	Transmission Type & Gear		No. of Vehicles	% of Vehicles
----------Automatic Transmission----------				
Maximum	4-Speed:	4th	44	13.1
		3rd	25	7.4
		2nd	17	5.1
	3-Speed:	3rd	145	43.2
		2nd	73	21.7
Part	4-Speed:	4th	7	2.1
	3-Speed	3rd	25	7.4
			336	100.0
----------Manual Transmission----------				
Maximum	5-Speed:	4th	36	51.4
		3rd	9	12.9
	4-Speed:	4th	13	18.6
		3rd	5	7.1
	3-Speed:	3rd	1	1.4
Part	5-Speed:	4th	1	1.4
	4-Speed:	4th	5	7.1
			70	100.0

END

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